

**ANÁLISIS DE DESEMPEÑO DE DIFERENTES TÉCNICAS DE COMPENSACIÓN ÓPTICAS Y
ELECTRÓNICA PARA LA CD EN REDES WDM**

ANEXO



DANIEL FERNANDO MELO FERNÁNDEZ

JAIRO ANDRES RUIZ TOLEDO

UNIVERSIDAD DEL CAUCA

FACULTAD DE INGENIERÍA ELECTRÓNICA Y TELECOMUNICACIONES

DEPARTAMENTO DE TELECOMUNICACIONES

GRUPO I+D NUEVAS TECNOLOGÍAS EN TELECOMUNICACIONES – GNTT

POPAYÁN

OCTUBRE DE 2011

**ANÁLISIS DE DESEMPEÑO DE DIFERENTES TÉCNICAS DE COMPENSACIÓN ÓPTICAS Y
ELECTRÓNICA PARA LA CD EN REDES WDM**

ANEXO

DANIEL FERNANDO MELO FERNÁNDEZ

JAIRO ANDRES RUIZ TOLEDO

**Documento Final de Trabajo de Grado para optar al título de
Ingeniero en Electrónica y Telecomunicaciones**

Director

Ing. ALEJANDRO TOLEDO TOVAR

UNIVERSIDAD DEL CAUCA

FACULTAD DE INGENIERÍA ELECTRÓNICA Y TELECOMUNICACIONES

DEPARTAMENTO DE TELECOMUNICACIONES

GRUPO I+D NUEVAS TECNOLOGÍAS EN TELECOMUNICACIONES – GNTT

POPAYÁN

OCTUBRE DE 2011

Anexo A: Subsistema de una red WDM

El subsistema transmisor, fig. 1, contiene generador de tráfico, codificación de línea, modulador y láser. El generador de tráfico produce un patrón pseudoaleatorio de datos. La codificación de línea es un componente importante que genera el formato de transmisión de datos deseado, convierte una señal de entrada lógica a una secuencia binaria [1]. El láser genera un láser su salida y la salida del driver electrónico van a un modulador.

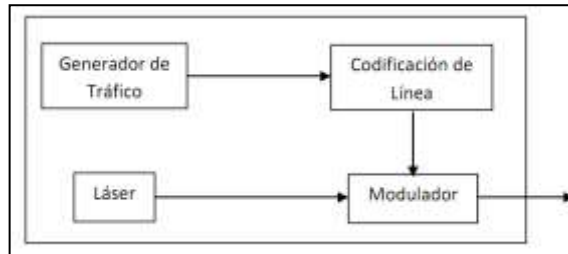


Figura 1. Subsistema Transmisor [1].

En la figura 2, se muestra la composición del subsistema multiplexor.

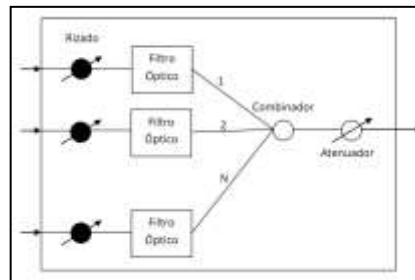


Figura 2. Subsistema Multiplexor [1].

El Subsistema del canal óptico, fig. 3, está compuesto por la fibra óptica principal y el amplificador óptico; finalmente el bloque del atenuador presenta una atenuación de los conectores de la fibra [1].

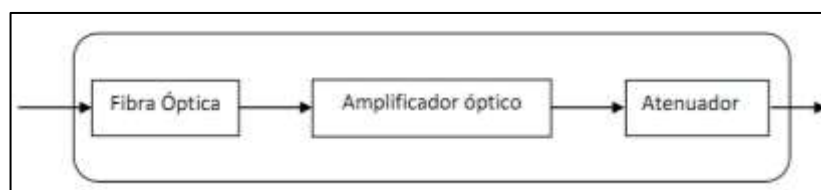


Figura3. Subsistema del Canal Óptico [1].

En la figura 4, se muestra la composición del subsistema multiplexor.

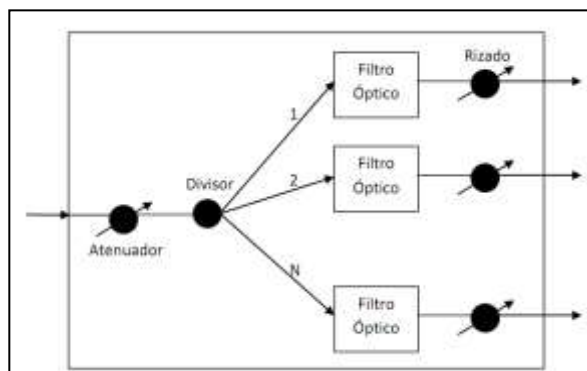


Figura 4. Subsistema Demultiplexor [1].

El subsistema de recepción, fig. 5, se encarga de detectar la señal en el receptor por el detector PIN y se pasa a través del filtro de salida eléctrico.

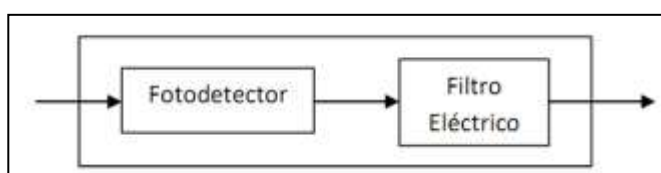


Figura 5. Subsistema de Recepción [1].

Anexo B: Formato de modulación NRZ-DPSK

El figura 1, muestra el contenido de la modulación NRZ-DPSK, donde se especifican los siguientes componentes:

- **NRZ-driver:** convierte la señal de entrada binaria proveniente del generador de tráfico, en una forma de onda eléctrica.
- **LPF_TX:** implementa un filtro pasa bajos tipo Bessel para modelar las características no ideales de la conversión binaria a eléctrica.
- **Laser_source:** modela la fuente de emisión de luz (laser CW).
- **MZM_phase:** Representa el modulador Mach-Zehnder usado para crear la salida modulada en fase.
- **MZM_carver:** Representa el modulador Mach-Zehnder usado para crear la salida de pulsos NRZ del transmisor.

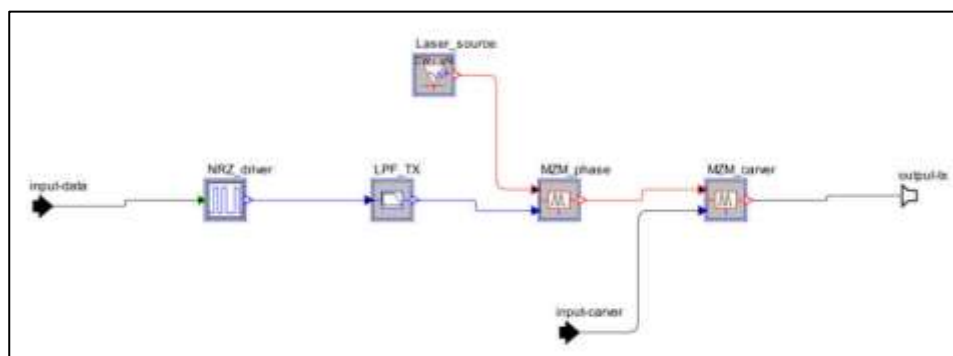


Figura 1. Modulador NRZ-DPSK.

Anexo C: Canal con distorsión de fase

Bajo una distorsión puramente de fase, el canal no pierde energía y por lo tanto la conservación de la energía requiere que la energía total contenida en el impulso, se asuma como la unidad [5]:

$$\sum_{i=0}^n |y_i|^2 = 1 \quad (1)$$

y_i : Representa valores complejos.

En efecto, las señales de entrada pueden ser escritas como [37]:

$$s_i = s_{0,i} + js_{1,i} \quad (2)$$
$$\text{Con } j = (-1)^{\frac{1}{2}}$$

Luego $s_{0,i}$ y $s_{1,i}$ pueden tomar en forma independiente cualquiera de los m valores¹, mostrados en la secuencia de posibles valores.

$$-(m-1)k, -(m-3)k, \dots, (m-1)k \quad (3)$$

Cuando el canal introduce distorsión de fase, este introduce una transformación unitaria en las señales transmitidas, de manera que los elementos de la señal recibida correspondientes a los elementos de la señal transmitida (valores complejos) son ortogonales [5]. Una transformación ortogonal es un caso especial de transformación unitaria donde todas las señales son valores reales. Bajo detección coherente entonces las señales detectadas están dadas por:

$$r_i = s_i y_0 + w_i \quad (4)$$

Donde se ha asumido, que la respuesta al impulso toma solo un valor y_0 diferente de cero y w_i es el ruido adicionado a la señal. El ruido es gaussiano de variables aleatorias estadísticamente independientes, con media cero y varianza σ^2 . Así se tiene:

$$r_i = s_i y_0 + js_{1,i} y_0 + w_i \quad (5)$$

Sin embargo, deben ser detectadas la parte real e imaginaria, así, en ausencia del ruido se tiene:

$$|r_i|^2 = s_{0,i}^2 + s_{1,i}^2 \quad (6)$$

Ya que la respuesta al impulso es de distorsión puramente de fase, entonces el valor absoluto de las componentes de la respuesta en el tiempo muestreada es igual a la unidad y así cuando las señales de entrada son convolucionadas con la respuesta al impulso, la fase de las componentes de las señales recibidas se rotan una cantidad fijada de fase. Esto es equivalente a invertir las componentes de la respuesta al impulso que están en torno al valor central en $t = 0$ por los conjugados complejos, así la secuencia del impulso puede ser escrita como:

$$y_i = y_i^* \quad (7)$$

¹ Téngase en cuenta que existen m tap y m coeficientes taps.

$$y(nT) = [y_0 y_1 \dots 0 \dots y_m^* y_{m-1}^* \dots y_1^*] \quad (8)$$

Alternativamente, se puede afirmar que cada vez que se invierte el conjugado complejo de una secuencia cuyas componentes están en torno a $t = 0$, entonces la secuencia representa una distorsión de fase. Así cuando la secuencia convolucionada con su secuencia original, se tiene como resultado una secuencia cuyas componentes son cero, excepto para la componente en el instante $t = 0$ que es la unidad.

Ahora, si se considera señales de entrada teniendo valores complejos de componentes muestreadas, como en el caso de señales ópticas QAM que comprende dos DPSK en cuadratura de fase o dos señales AM en cuadratura, una de las cuales lleva los símbolos de datos $s_{1,i}$ [5]. Cada señal AM se asocia con el correspondiente modulador y demodulador para recuperar nuevamente la señal en banda base; conforme a ello, para formatos de modulación avanzados la detección puede ser coherente o no coherente. En la detección coherente la respuesta al impulso toma la amplitud y preserva su fase [5], mientras en la detección no coherente o detección directa, la respuesta al impulso es el resultado de la combinación de diferentes componentes en el proceso de detección y su respuesta sigue basada en intensidad [5]. En este caso la respuesta puede ser estimada considerando la distribución gaussiana con el factor de ensanchamiento del pulso.

Anexo D: Solución Matemática paso a paso al modelo del filtro transversal

La Figura 1, muestra la estructura de un ecualizador transversal.

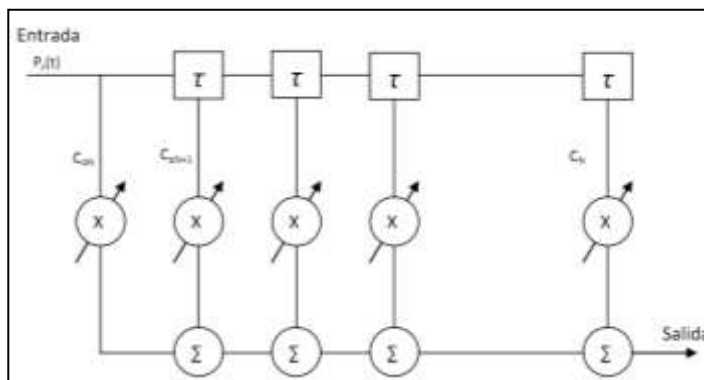


Figura 1. Estructura de un ecualizador transversal [39].

El proceso aplicado a la señal mediante un ecualizador transversal inicia teniendo en cuenta que la salida del filtro para cualquier instante de tiempo viene dada por [6]:

$$P_{eq}(t) = p_r(t)C_{-N} + p_r(t - \tau)C_{-N+1} + p_r(t - 2\tau)C_{-N+2} + \dots + p_r(t - N\tau)C_0 + p_r(t - (N + 1)\tau)C_1 + \dots + p_r(t - 2N\tau)C_N \quad (1)$$

En la práctica solo interesa el valor de la salida en los instantes de muestreo. Los retardos se pueden implementar mediante circuitos o dispositivos de carga acoplada (CCD)², con un reloj igual al tiempo de duración del bit. La salida se observará en tiempos discretos $t_k = k\tau$; entonces podemos escribir $P_{eq}(k)$ como $P_{eq}(t_k)$ y así sucesivamente [6, 44, 49].

$$P_{eq}(k) = p_r(k)C_{-N} + p_r(k - 1)C_{-N+1} + p_r(k - 2)C_{-N+2} + \dots + p_r(k - N)C_0 + p_r(k - (N + 1)\tau)C_1 + \dots + p_r(k - 2N)C_N \quad (2)$$

² Es un circuito integrado que contiene un número determinado de condensadores enlazados o acoplados.

Si ahora se considera la N-esima muestra (la correspondiente a la mitad de los taps), se tiene:

$$P_{eq}(N) = p_r(N)C_{-N} + p_r(N-1)C_{-N+1} + p_r(N-2)C_{-N+2} + \dots + p_r(0)C_0 + p_r(-1)C_1 + \dots + p_r(-N)C_N \quad (3)$$

La siguiente muestra será:

$$P_{eq}(N+1) = p_r(N+1)C_{-N} + p_r(N)C_{-N+1} + p_r(N-1)C_{-N+2} + \dots + p_r(1)C_0 + p_r(0)C_1 + \dots + p_r(1-N)C_N \quad (4)$$

Esto se puede expresar en forma matricial como:

$$\begin{bmatrix} \vdots \\ P_{eq}(N-1) \\ P_{eq}(N) \\ P_{eq}(N+1) \\ \vdots \end{bmatrix} = \begin{bmatrix} \vdots & \vdots & \vdots & \vdots \\ P_r(N-1) & \dots P_r(-1) & \dots & P_r(-1-N) \\ P_r(N) & \dots P_r(0) & \dots & P_r(-N) \\ P_r(N+1) & \dots P_r(1) & \dots & P_r(1-N) \\ \vdots & \vdots & \vdots & \vdots \end{bmatrix} X \begin{bmatrix} C_{-N} \\ \vdots \\ C_0 \\ \vdots \\ C_N \end{bmatrix} \quad (5)$$

Para eliminar la ISI se debe garantizar que todas las muestras de la señal ecualizada sean cero, a excepción el bit que se está detectando. En la ecuación 4, esto significa hacer $P_{eq}(k)=0$ para $k=0$ a $2N$, excepto $k=N$. Asumiendo un valor de 1 para $P_{eq}(N)$, en la ecuación 4, se tiene que:

$$\begin{bmatrix} \vdots \\ 0 \\ 1 \\ 0 \\ \vdots \end{bmatrix} = \begin{bmatrix} \vdots & \vdots & \vdots & \vdots \\ P_r(N-1) & \dots P_r(-1) & \dots & P_r(-1-N) \\ P_r(N) & \dots P_r(0) & \dots & P_r(-N) \\ P_r(N+1) & \dots P_r(1) & \dots & P_r(1-N) \\ \vdots & \vdots & \vdots & \vdots \end{bmatrix} X \begin{bmatrix} C_{-N} \\ \vdots \\ C_0 \\ \vdots \\ C_N \end{bmatrix} \quad (6)$$

Entonces, el diseño del ecualizador transversal se reduce al hallar los valores de los coeficientes C_i que satisfagan la condición anterior. Para ello habría que invertir la matriz formada por las muestras lo cual puede ser engorroso si el ecualizador contiene un gran número de taps [6]. Sin embargo, la situación se simplifica si se observa la simetría de dicha matriz. A pesar de que la matriz es de dimensión $4 \times N \times N$, sólo existen $2N+3$ elementos diferentes. Este tipo de matrices se conocen como Toeplitz y se resuelven por medio de algoritmos recursivos que consumen menos recursos computacionales [6, 7, 8].

Anexo E: Proceso de ecualización basado en ZF

Un FFE o DFE combinado con un proceso ZF busca colocar en cero todas las componentes muestreadas de la respuesta al impulso anteriores a la de mayor magnitud, sin cambiar los valores relativos de las componentes restantes. Posteriormente, un ecualizador no lineal puede completar el proceso, generando una ecualización exacta del canal. Un proceso ZF opera de la siguiente manera:

Considerando que y_1 es la componente de mayor magnitud de la respuesta al impulso ecuación 1.14 capítulo 1, entonces la transformada z para un filtro lineal FFE de $(m+1)$ - taps está dada por:

$$C(z) = c_0 + c_1 z^{-1} \dots + c_m z^{-m} \quad (1)$$

De tal manera que

$$Y(z)C(z) \approx z^{-h} \quad (2)$$

Donde h es un entero positivo en el rango $(m + g)$, asumiendo que la respuesta en frecuencia de la función de transferencia $Y(z)$ no tiene ceros sobre el círculo unitario del plano z . Ahora, la función de transferencia del filtro D FFE de $(n + 1)$ tap es:

$$d(nT) = [d_0 d_1 \dots d_n] \quad (3)$$

$$D(z) = d_0 + d_1 z^{-1} \dots + d_n z^{-n} \quad (4)$$

La respuesta al impulso muestreada requerida del sistema combinado, consiste de la respuesta del canal muestreada, el filtro lineal D que está dado por el $(g - l + 1)$ componentes del vector fila:

$$E = \left[1 + \frac{y_{l+1}}{y_l} \frac{y_{l+2}}{y_l} \frac{y_{l+3}}{y_l} \dots \frac{y_g}{y_l} \right] \quad (5)$$

$$E(z) = \left[1 + \frac{y_{l+1}}{y_l} z^{-1} + \frac{y_{l+2}}{y_l} z^{-2} + \frac{y_{l+3}}{y_l} z^{-3} \dots \frac{y_g}{y_l} z^{-g+1} \right] \quad (6)$$

Claramente E es obtenido removiendo las primeras componentes l y dividiéndolas entre y_l . Como y_l es la magnitud máxima entonces todos los coeficientes del filtro E son menores que la unidad. $D(z)$, ahora puede ser escrito como:

$$D(z) = E(z)C(z) \quad (7)$$

$$Y(z)D(z) = Y(z)C(z)E(z) \approx z^{-h}E(z) \quad (8)$$

La transformada z del $(i + 1)$ ésimo elemento de señal transmitido es $s_i z^{-i}$ por lo tanto la transformada z de la $(i + 1)$ ésimo elemento de señal recibido en la salida del filtro lineal D está dado por:

$$s_i z^{-i-h} E(z) = s_i z^{-i-h} \left[1 + \frac{y_{l+1}}{y_l} z^{-1} + \frac{y_{l+2}}{y_l} z^{-2} + \frac{y_{l+3}}{y_l} z^{-3} \dots \frac{y_g}{y_l} z^{-g+1} \right] \quad (9)$$

Por tanto se aprecia que cada vez que hay un término diferente de cero va a existir interferencia entre símbolos (ISI) entre los elementos de la señal en la salida del filtro lineal. Esta ISI es entonces removida en el ecualizador no lineal que ecualiza la transformación $z^{-h}E(z)$ según lo dado anteriormente. Luego si el filtro FFE con el número de taps $(g - l)$ se tendran coeficientes de ganancia tap:

$$\frac{y_{l+1}}{y_l}, \frac{y_{l+2}}{y_l}, \frac{y_{l+3}}{y_l} \dots \frac{y_g}{y_l} \quad (10)$$

Luego la entrada al sustractor en el instante $(i + h)T$ es:

$$v_{i+h} = s'_i + \frac{y_{l+1}}{y_l} s'_{i-1} + \frac{y_{l+2}}{y_l} s'_{i-2} + \frac{y_{l+3}}{y_l} s'_{i-3} + \dots + \frac{y_g}{y_l} s'_{i-g+l} + u_{i+h} \quad (11)$$

Donde s'_{i-j} es el valor detectado de s_{i-j} en la salida del ecualizador. Con la correcta detección de $s_{i-1}, s_{i-2}, \dots, s_{i-g+l}$ las señales a la entrada del detector se convierten en:

$$x_{i+h} \approx s_i + u_{i+h} \quad (12)$$

Donde $x_{i+h} > 0$, $s'_i = k$ y cuando $x_{i+h} < 0$, $s'_i = -k$, especialmente para constelaciones DPSK, DQPSK o QAM. La componente de ruido u_{i+h} esta dada por:

$$u_{i+h} = \sum_{j=0}^n w_{i+h-j} d_j \quad (13)$$

Las componentes de ruido son variables gaussianas estadísticamente independientes con media 0 y varianza σ , por lo tanto la varianza total de la componente de ruido de la señal detectada es:

$$\eta = \sigma^2 \sum_{j=0}^n d_j^2 = \sigma^2 |D|^2 \quad (14)$$

Donde $|D|$ es la longitud euclidiana del vector D, así la probabilidad de error de la detección de s_i da la correcta detección de $s_{i-1}, s_{i-2}, \dots, s_{i-g+l}$ que puede ser aproximadamente:

$$P_e = \int_k^{\infty} \frac{1}{\sqrt{2\pi\eta^2}} e^{-\frac{u^2}{2\eta^2}} du = Q\left(\frac{k}{\eta}\right) = Q\left(\frac{k}{\sigma|D|}\right) \quad (15)$$

Donde k representa la amplitud promedio total de la señal en la salida del receptor. Este tipo de proceso de ecualización FZ puede ser optimizado para reducir la probabilidad de error, por ejemplo, el uso de dos funciones de transferencia en cascada para reemplazar la función de transferencia equivalente de la fibra, el ecualizador lineal toma una parte y luego el ecualizador no lineal toma la otra. Así entonces, se podría reducir el número de taps del filtro lineal FFE y de esta manera mejora las demandas puestas sobre el procesador electrónico en cuanto a la velocidad de operación.

Anexo F: Proceso de ecualización basado en MMSE

Ambos, FFE y DFE pueden ecualizar y minimizar el error contribuido por el ruido y distorsión, bajo la ecualización basada en MSE, el ecualizador FFE minimiza la diferencia media entre el actual e ideal valor muestreado en su salida por un dado número de taps, para el ecualizador DFE, la minimización del error ocurre en el punto diferenciador y la salida del FFE, Fig. 1.21 capítulo 1.

En la ecualización lineal, se renombra que la función de transferencia del canal dada en la ecuación 5 anexo D de la respuesta al impulso muestreada del canal y el ecualizador está dada por el vector fila de $(m + g + 1)$ componentes:

$$E = [e_0 e_1 \dots \dots e_{m+g}] \quad (1)$$

El valor ideal de la respuesta al impulso del canal y el ecualizador está dado por el vector fila de $(m + g + 1)$ componentes:

$$E_h = \left[\underbrace{0 \dots 0 \dots 0}_h \ 1 \ 0 \dots 0 \right] \quad (2)$$

Con h un entero dentro del rango $(m + g)$. La minimización es por tanto conducida por el valor medio esperado:

$$E[(x_{i+h} - s_i)^2] = k^2|E - E_h|^2 + \sigma^2|C|^2 \quad (3)$$

Donde $k^2|E - E_h|^2$ y $\sigma^2|C|^2$ son los términos del error cuadrático medio en las señales recibidas x_{i+h} debido a ISI y al ruido gaussiano respectivamente, C es la respuesta al impulso muestreada del $(m + 1)$ componentes fila del FFE denotada por:

$$C = [c_0 c_1 \dots \dots \dots c_m] \quad (5)$$

En el ecualizador no lineal DFE, la minimización ocurre en el sustractor ³ de error. El error cuadrático medio de la señal ecualizada necesita ser minimizado como el valor esperado expresado como:

$$\varepsilon = E[(x_{i+h} - s_i)^2] \quad (6)$$

Dado que los símbolos de datos $s_{i-1}, s_{i-2}, \dots, s_{i-\mu}$ han sido correctamente detectados, el proceso MSE se implementa ajustando los filtros D FFE, el FFE antes del DFE y F como el FFE en la guía de realimentación del DFE. Las respuestas al impulso muestreadas de esos filtros son expresadas como:

$$D = [d_0 d_1 \dots \dots \dots d_n] \quad (7)$$

$$E = [e_0 e_1 \dots \dots \dots e_{n+g}] \quad (8)$$

$$F = [f_0 f_1 \dots \dots \dots f_\mu] \quad (9)$$

$$S = [s_i s_{i-1} s_{i-2} \dots \dots \dots s_{i-n-g}] \quad (10)$$

Con E como el impulso muestreado del canal de fibra y el ecualizador lineal FFE D, S es la señal muestreada correctamente detectada en la salida del ecualizador. Las señales en la entrada del detector en la Figura 1.21 capítulo 1 en el instante $t = (i + h)T$ están dadas por:

$$x_{i+h} = \sum_{j=0}^{n+g} s_{i+h} e_j - \sum_{j=1}^{\mu} s_{i-j} f_j + u_{i+h} = s_{i+h} E^T - s_{i+h} F_0^T + u_{i+h} \quad (11)$$

Con
$$F_0 = \left[\underbrace{0 \dots \dots 0}_h \quad f_1 \quad f_2 \dots f_\mu \right] \quad (12)$$

Por lo tanto el error cuadrático medio puede ser escrito como:

$$\varepsilon = k^2|B|^2 + \sigma^2|D|^2 \quad (13)$$

Con:
$$B = E - F_0 - E_h = [b_0 b_1 \dots \dots \dots b_{n+g}] \quad (14)$$

$$E_h = \left[\underbrace{0 \dots \dots 0}_h \quad 1 \quad 0 \quad 0 \right] \quad (15)$$

Los símbolos de datos se suponen que son estadísticamente ortogonales con media cero y varianza K^2 . El ecualizador no lineal realimentado DFE se asume para tener μ taps en el filtro F . Este es el menor número de taps para lograr cancelación total de todas las componentes que

³ Son diseñados con la misma funcionalidad de un sumador.

generan ISI en x_{i+h} , incluyendo símbolos de datos $s_{i-1}, s_{i-2}, \dots, s_{i-\mu}$ que han sido detectados. Posteriormente el error cuadrático medio puede ser obtenido como:

$$\varepsilon = k^2 \left[1 - E_h Z^T \left(Z Z^T + \frac{\sigma^2}{k^2} I \right)^{-1} Z E_h^T \right] \quad (16)$$

Anexo G: Pre-compensación electrónica para la CD

Considerando el arreglo de la Figura 1.25 capítulo 1, pero para pre compensación, actuando como un esquema de pre distorsión, el ecualizador no lineal en este caso convierte la secuencia de símbolos de datos $\{s_i\}$ dentro de un canal no lineal $\{f_i\}$ a la salida del transmisor, posteriormente un modulador óptico controlado por la salida del ecualizador no lineal como en Figura 1, esos símbolos son muestreados y transmitidos como impulsos de la forma $\{f_i \delta(t - iT)\}$. La SNR en este caso es dada por $\frac{E[f_i^2]}{\sigma^2}$ con la energía promedio esperada de la secuencia de señal pre distorsionada igual a K^2 .

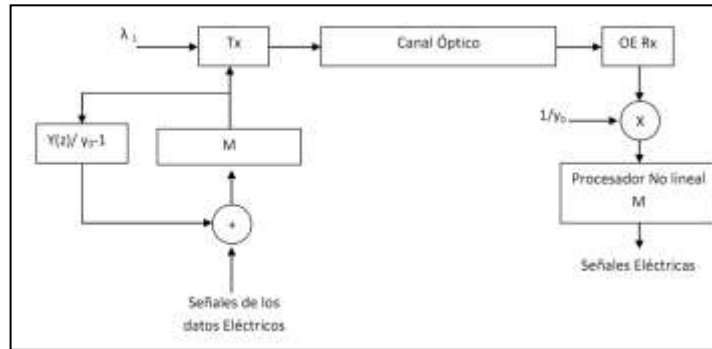


Figura 1. Ecualizador no lineal.

Es necesario un procesador no lineal después de la conversión opto-electrónica en el receptor; este elemento realiza una operación *modulo-m* sobre la secuencia recibida $x[\text{modulo}] - m = x - jm$ con j un número entero. La transformada z $F(z)$ en la salida del ecualizador de distorsión no lineal está dada por:

$$F(z) = M[S(z) - F(z)(y_0^{-1}Y(z) - 1)] \quad (1)$$

Donde $s(z)$ es la transformada z de las señales de entrada muestreadas y $Y(z)$ es la transformada z de la función de transferencia del canal. Luego la transformada z en la salida del procesador no lineal en el receptor, puede ser escrita como:

$$X(z) = M[F(z)Y(z) + W(z)] = M[F(z)(y_0^{-1}Y(z) - y_0^{-1}W(z))] \quad (2)$$

$$o \quad X(z) = M[S(z) - y_0^{-1}W(z)] \quad (3)$$

También

$$x_i = M[y_0^{-1}r_i] = M[s_i + y_0^{-1}w_i] \quad (4)$$

Donde x_i denota la señal en la salida del procesador no lineal y claramente toda la ISI ha sido eliminada excepto la contribución de ruido. El procesador no lineal M opera como un *modulo - m* y por tanto:

$$M[q] = [(q + 2k) \text{ modulo } -4k] - 2k = q - 4jk \quad (5)$$

$$-2k \leq M[q] \leq 2k \quad (6)$$

Por lo tanto, un error sucedería cuando:

$$(4j - 3)k \leq y_0^{-1}w_i \leq (4j - 1)k \quad \forall j \quad (7)$$

Entonces la probabilidad de error es entonces dada como:

$$P_e = 2 \int_k^{\infty} \frac{1}{\sqrt{2\pi}y_0^{-2}\sigma^2} e^{-\frac{w^2}{2y_0^2\sigma^2}} dw = 2Q\left(\frac{k|y_0|}{\sigma}\right) \quad (8)$$

Anexo H: Parámetros de monitoreo óptico

Para los sistemas de fibra óptica WDM, existen una serie de parámetros que proveen información sobre el desempeño de la red, como son la BER, el Factor Q, la OSNR, entre otros; dichos parámetros brindan información relacionada a la calidad de la señal óptica. A continuación se realiza una descripción de los parámetros de monitoreo óptico definidos en el estándar ITU-T G.697 [9], relevantes para el desarrollo del presente trabajo de grado.

1. Factor Q: Se define como la Relación Señal a Ruido Eléctrica (ESNR - Electrical Signal to Noise Ratio) en la entrada de un circuito de decisión de un receptor de señal digital. Se supone que en condiciones ideales, el factor Q está dado por los niveles lógicos μ_0 y μ_1 , y por la distribución del ruido Gaussiano en torno a los niveles "1" y "0", definidos por las desviaciones típicas σ_0 y σ_1 , como se aprecia en la ecuación 1 y 2.

$$Q = \frac{\mu_1 - \mu_0}{\sigma_0 + \sigma_1} \quad (1)$$

$$Q(\text{decibelios}) = 20 \log_{10} Q(\text{lineal}) \quad (2)$$

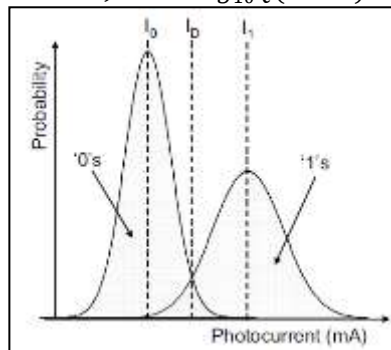


Figura 1. Definición del umbral óptico de decisión [9].

En la práctica, hay una serie de factores que causan distorsiones cuyo efecto es que la forma de la distribución deja de ser Gaussiano, no obstante, esas distorsiones afectan principalmente a las regiones superiores de la distribución, mientras que con la distribución de Gauss se puede efectuar una aproximación muy precisa de los extremos. Donde la región en que se superponen la distribución, representa la probabilidad de que se produzcan errores como se aprecia en la figura 1 [10].

2. Tasa de Errores de Bit (BER): El parámetro más importante utilizado en comunicaciones ópticas es la Tasa de Error de Bit (BER – Bit Error Rate), que representa el número esperado de bits que se han transmitido erróneamente. Según la ITU-T para los sistemas de

comunicaciones en general, el valor usual de la BER se encuentra alrededor de 10^{-9} , es decir, un bit erróneo por cada mil millones de bits transmitidos, en la figura 1.10 se aprecia la relación entre la función densidad de probabilidad y la BER [9,11].

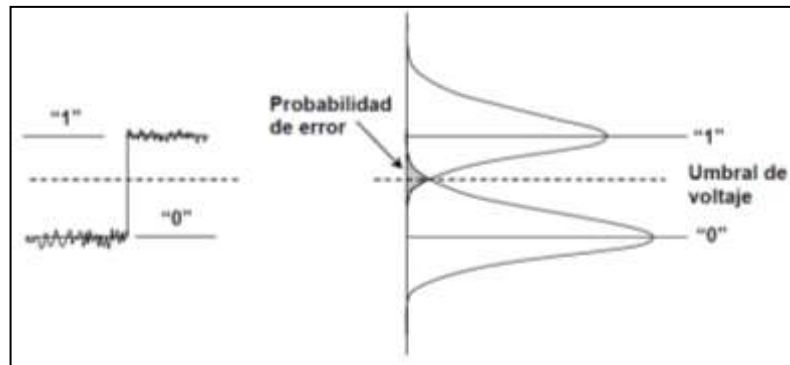


Figura 2. Distribución de probabilidad para "0" y "1" lógicos [11].

El factor Q puede ser usado para dar un valor aproximado de la BER si se considera que las distribuciones en el receptor de las señales correspondientes a los "1" y "0" lógicos, tienen una forma Gaussiana. En este caso, el factor Q y la BER están relacionados por la ecuación (1.5) [9].

$$BER = \frac{1}{2} \operatorname{erfc} \left(\frac{Q}{\sqrt{2}} \right) \quad (3)$$

3. Relación Señal a Ruido óptica (OSNR): La Relación Señal a Ruido Óptico (OSNR - Optical Signal to Noise Ratio), se define como la medida de la relación de la potencia de la señal con respecto a la potencia de ruido en un canal óptico. La OSNR es un parámetro muy importante, dado que sugiere que tanto es degradada una señal óptica que es transportada dentro de un sistema debido a las múltiples atenuaciones. La OSNR (en dB) puede calcularse en la ecuación (4) [12]:

$$OSNR = 10 \log \frac{P_i}{N_i} + 10 \log \frac{B_m}{B_r} \quad (4)$$

Donde P_i es la potencia óptica de la señal, B_m es el ancho de banda, N_i es el valor promedio de la potencia de ruido medido en el ancho de banda B_m y B_r es el ancho de banda óptico de referencia típicamente seleccionado para 0.1nm.

La compensación de la OSNR es casi imposible para sistemas WDM multicanal, dado que cada etapa de amplificación involucra un incremento en los niveles de ruido con respecto a la potencia del canal (figura 3). Los diseños basados en la OSNR, desean mantener una relación BER específica al final de las etapas de los enlaces, es decir en el receptor.

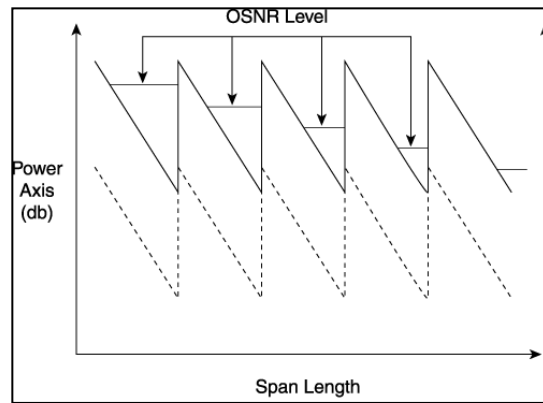


Figura 3. Niveles de OSNR para transmisiones WDM con múltiples etapas [14].

4. **Diagrama del Ojo:** El uso del diagrama del ojo permite el análisis de las formas de onda de los pulsos que se propagan en el canal de transmisión y del cual se pueden deducir parámetros de medición como la BER y el factor Q. Así mismo, muestra en un rango de tiempo la superposición de las distintas combinaciones de posibles unos y ceros. Como se aprecia en la Figura 4, el diagrama de ojo permite observar parámetros que determinan la calidad de la señal, donde se identifican dos tipos de cruces: cruce de tiempo, en el cual se produce la apertura y cierre del ojo, y cruce de amplitud el cual consiste en el nivel de voltaje que produce la apertura y cierre del ojo definiéndose en el periodo de bit [14].

En la figura 4, el eje Y muestra el nivel de amplitud de la señal, entre menor sea esta apertura, se compromete más el desempeño del sistema debido a efectos como la atenuación, la ISI y el margen del ruido. Por otra parte, en el eje X o eje de tiempo se observa la incidencia del sincronismo y del jitter, así mismo se observan las distintas regiones específicas o máscaras del diagrama del ojo, en donde cualquier señal que se propague hace referencia a problemas y errores en la transmisión.

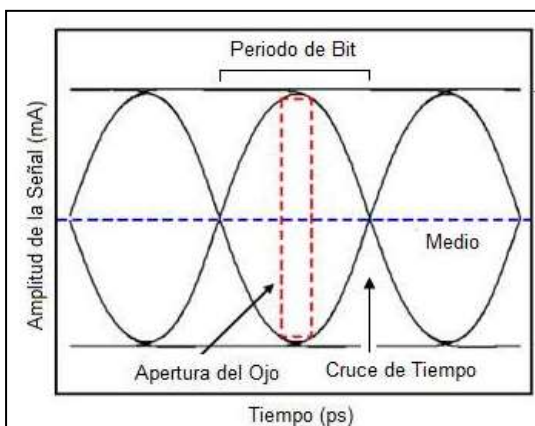


Figura 4. Parámetros del Diagrama del Ojo [7].

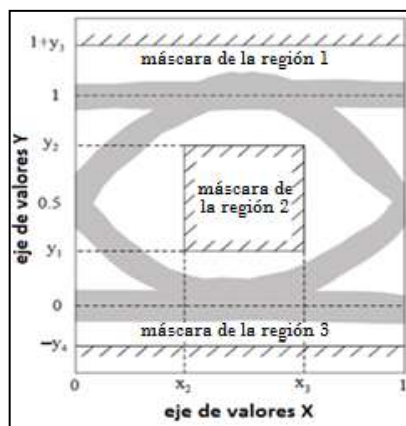


Figura 5. Regiones del Diagrama del Ojo [9].

Anexo I: Configuración 1 - Escenario de simulación en ausencia de técnicas de compensación para la CD con formato de modulación NRZ-OOK.

Ptx	Distancia_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)
1.0000e-003	6.0000e+001	1	2.1912e-015	2.0269e-017	2.2187e-013	1.7890e+001	2.1342e-005
1.0000e-003	6.5000e+001	1	7.0823e-012	1.4174e-013	3.7003e-010	1.6594e+001	1.4860e-005
1.0000e-003	7.0000e+001	1	2.0776e-009	9.2956e-011	3.9358e-008	1.5384e+001	1.0088e-005
1.0000e-003	7.5000e+001	1	7.4366e-007	8.8824e-008	5.3634e-006	1.3648e+001	6.4184e-006
1.0000e-003	8.0000e+001	1	1.3199e-004	3.5358e-005	4.4827e-004	1.1242e+001	3.2224e-006
1.0000e-003	8.5000e+001	1	4.2120e-003	1.9413e-003	8.6312e-003	8.4142e+000	1.1115e-006
1.0000e-003	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000
1.0000e-003	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000
1.0000e-003	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000
2.0000e-003	6.0000e+001	1	7.2040e-019	2.4844e-021	1.9580e-016	1.8884e+001	4.5466e-005
2.0000e-003	6.5000e+001	1	1.4524e-015	1.0154e-017	2.3963e-013	1.7947e+001	3.2206e-005
2.0000e-003	7.0000e+001	1	1.3813e-014	9.6691e-017	1.7269e-012	1.7627e+001	2.2791e-005
2.0000e-003	7.5000e+001	1	5.3975e-013	6.1757e-015	3.5866e-011	1.7050e+001	1.5311e-005
2.0000e-003	8.0000e+001	1	2.8467e-009	1.2224e-010	5.8152e-008	1.5307e+001	9.9808e-006
2.0000e-003	8.5000e+001	1	6.9166e-006	1.0202e-006	4.2389e-005	1.2763e+001	5.5603e-006
2.0000e-003	9.0000e+001	1	8.1847e-004	2.8054e-004	2.2188e-003	9.9641e+000	2.5281e-006
2.0000e-003	9.5000e+001	1	9.1158e-003	4.5948e-003	1.7137e-002	7.4615e+000	4.9604e-007
2.0000e-003	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000
3.0000e-003	6.0000e+001	1	1.0326e-019	2.7132e-022	3.3857e-017	1.9094e+001	6.9232e-005
3.0000e-003	6.5000e+001	1	1.8393e-016	1.0266e-018	3.2750e-014	1.8222e+001	4.9424e-005
3.0000e-003	7.0000e+001	1	2.5363e-016	1.0115e-018	5.1928e-014	1.8180e+001	3.5531e-005
3.0000e-003	7.5000e+001	1	3.5566e-016	1.2023e-018	7.1866e-014	1.8136e+001	2.4273e-005
3.0000e-003	8.0000e+001	1	2.9327e-012	3.4942e-014	2.2582e-010	1.6755e+001	1.5829e-005
3.0000e-003	8.5000e+001	1	9.9436e-008	6.7380e-009	1.2934e-006	1.4321e+001	9.7129e-006
3.0000e-003	9.0000e+001	1	6.8516e-005	1.5754e-005	2.7062e-004	1.1626e+001	5.5852e-006
3.0000e-003	9.5000e+001	1	1.6339e-003	6.2976e-004	3.9459e-003	9.3709e+000	2.4419e-006
3.0000e-003	1.0000e+002	1	9.8286e-003	5.0898e-003	1.8082e-002	7.3577e+000	6.1058e-007
4.0000e-003	6.0000e+001	1	5.0212e-020	1.1863e-022	1.7429e-017	1.9170e+001	9.2736e-005
4.0000e-003	6.5000e+001	1	9.0514e-017	4.7794e-019	1.5516e-014	1.8312e+001	6.6506e-005
4.0000e-003	7.0000e+001	1	5.1409e-017	1.7034e-019	1.2036e-014	1.8383e+001	4.8254e-005
4.0000e-003	7.5000e+001	1	8.4176e-018	1.6019e-020	2.8325e-015	1.8602e+001	3.3509e-005
4.0000e-003	8.0000e+001	1	5.5354e-014	3.3046e-016	8.6208e-012	1.7417e+001	2.1620e-005
4.0000e-003	8.5000e+001	1	9.0992e-009	4.0216e-010	1.7399e-007	1.5008e+001	1.3786e-005
4.0000e-003	9.0000e+001	1	1.6375e-005	3.0454e-006	7.8447e-005	1.2368e+001	8.3687e-006
4.0000e-003	9.5000e+001	1	5.5457e-004	1.8434e-004	1.5392e-003	1.0268e+001	4.4216e-006
4.0000e-003	1.0000e+002	1	3.7439e-003	1.6678e-003	7.9121e-003	8.5443e+000	1.8697e-006

Tabla 1. Medidas de BER estimado, factor Q y apertura del ojo. Configuración 1 NRZ-OOK. Rango de SMF-28de 60 a 120 km. Rango de potencia de transmisión 1 a 4 mw.

Anexo J: Configuración 1 - Escenario de simulación en ausencia de técnicas de compensación para la CD con formato de modulación NRZ-DPSK.

Ptx	Distancia_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)
1.0000e-003	6.0000e+001	1	2.1912e-015	2.0269e-017	2.2187e-013	1.7890e+001	2.1342e-005
1.0000e-003	6.5000e+001	1	7.0823e-012	1.4174e-013	3.7003e-010	1.6594e+001	1.4860e-005
1.0000e-003	7.0000e+001	1	2.0776e-009	9.2956e-011	3.9358e-008	1.5384e+001	1.0088e-005
1.0000e-003	7.5000e+001	1	7.4366e-007	8.8824e-008	5.3634e-006	1.3648e+001	6.4184e-006
1.0000e-003	8.0000e+001	1	1.3199e-004	3.5358e-005	4.4827e-004	1.1242e+001	3.2224e-006
1.0000e-003	8.5000e+001	1	4.2120e-003	1.9413e-003	8.6312e-003	8.4142e+000	1.1115e-006
1.0000e-003	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000
1.0000e-003	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000
1.0000e-003	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000
2.0000e-003	6.0000e+001	1	7.2040e-019	2.4844e-021	1.9580e-016	1.8884e+001	4.5466e-005
2.0000e-003	6.5000e+001	1	1.4524e-015	1.0154e-017	2.3963e-013	1.7947e+001	3.2206e-005
2.0000e-003	7.0000e+001	1	1.3813e-014	9.6691e-017	1.7269e-012	1.7627e+001	2.2791e-005
2.0000e-003	7.5000e+001	1	5.3975e-013	6.1757e-015	3.5866e-011	1.7050e+001	1.5311e-005
2.0000e-003	8.0000e+001	1	2.8467e-009	1.2224e-010	5.8152e-008	1.5307e+001	9.9808e-006
2.0000e-003	8.5000e+001	1	6.9166e-006	1.0202e-006	4.2389e-005	1.2763e+001	5.5603e-006
2.0000e-003	9.0000e+001	1	8.1847e-004	2.8054e-004	2.2188e-003	9.9641e+000	2.5281e-006
2.0000e-003	9.5000e+001	1	9.1158e-003	4.5948e-003	1.7137e-002	7.4615e+000	4.9604e-007
2.0000e-003	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000
3.0000e-003	6.0000e+001	1	1.0326e-019	2.7132e-022	3.3857e-017	1.9094e+001	6.9232e-005
3.0000e-003	6.5000e+001	1	1.8393e-016	1.0266e-018	3.2750e-014	1.8222e+001	4.9424e-005
3.0000e-003	7.0000e+001	1	2.5363e-016	1.0115e-018	5.1928e-014	1.8180e+001	3.5531e-005
3.0000e-003	7.5000e+001	1	3.5566e-016	1.2023e-018	7.1866e-014	1.8136e+001	2.4273e-005
3.0000e-003	8.0000e+001	1	2.9327e-012	3.4942e-014	2.2582e-010	1.6755e+001	1.5829e-005
3.0000e-003	8.5000e+001	1	9.9436e-008	6.7380e-009	1.2934e-006	1.4321e+001	9.7129e-006
3.0000e-003	9.0000e+001	1	6.8516e-005	1.5754e-005	2.7062e-004	1.1626e+001	5.5852e-006
3.0000e-003	9.5000e+001	1	1.6339e-003	6.2976e-004	3.9459e-003	9.3709e+000	2.4419e-006
3.0000e-003	1.0000e+002	1	9.8286e-003	5.0898e-003	1.8082e-002	7.3577e+000	6.1058e-007
4.0000e-003	6.0000e+001	1	5.0212e-020	1.1863e-022	1.7429e-017	1.9170e+001	9.2736e-005
4.0000e-003	6.5000e+001	1	9.0514e-017	4.7794e-019	1.5516e-014	1.8312e+001	6.6506e-005
4.0000e-003	7.0000e+001	1	5.1409e-017	1.7034e-019	1.2036e-014	1.8383e+001	4.8254e-005
4.0000e-003	7.5000e+001	1	8.4176e-018	1.6019e-020	2.8325e-015	1.8602e+001	3.3509e-005
4.0000e-003	8.0000e+001	1	5.5354e-014	3.3046e-016	8.6208e-012	1.7417e+001	2.1620e-005
4.0000e-003	8.5000e+001	1	9.0992e-009	4.0216e-010	1.7399e-007	1.5008e+001	1.3786e-005
4.0000e-003	9.0000e+001	1	1.6375e-005	3.0454e-006	7.8447e-005	1.2368e+001	8.3687e-006
4.0000e-003	9.5000e+001	1	5.5457e-004	1.8434e-004	1.5392e-003	1.0268e+001	4.4216e-006
4.0000e-003	1.0000e+002	1	3.7439e-003	1.6678e-003	7.9121e-003	8.5443e+000	1.8697e-006

Tabla 1. Medidas de BER estimado, factor Q y apertura del ojo. Configuración 1 NRZ-DPSK. Rango de SMF-28de 60 a 120 km. Rango de potencia de transmisión 1 a 4 mw.

Anexo k: Configuración 2 para 1 span, mono canal y formato de modulación NRZ-OOK.

Ptx	Longitud_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)
1.0000e-003	7.0000e+001	1	2.0556e-061	3.0018e-070	8.5786e-051	2.4346e+001	8.9386e-004
1.0000e-003	7.5000e+001	1	4.2483e-046	4.4044e-053	3.9429e-038	2.3049e+001	8.6710e-004
1.0000e-003	8.0000e+001	1	4.7373e-033	5.0083e-039	2.2213e-027	2.1524e+001	8.3718e-004
1.0000e-003	8.5000e+001	1	9.7009e-023	4.7936e-027	1.0340e-018	1.9776e+001	8.0416e-004
1.0000e-003	9.0000e+001	1	3.6835e-015	5.8278e-018	3.1236e-012	1.7817e+001	7.4650e-004
1.0000e-003	9.5000e+001	1	5.9611e-009	1.0048e-011	5.1462e-008	1.5680e+001	6.7267e-004
1.0000e-003	1.0000e+002	1	1.5094e-006	1.1692e-007	2.3339e-005	1.3385e+001	5.7082e-004
1.0000e-003	1.0500e+002	1	2.1216e-004	4.3139e-005	1.0837e-003	1.0942e+001	4.3714e-004
1.0000e-003	1.1000e+002	1	6.0343e-003	3.3975e-003	1.0457e-002	7.9939e+000	2.5645e-004
2.0000e-003	7.0000e+001	1	7.2812e-079	5.3949e-090	3.5908e-066	2.5467e+001	1.8447e-003
2.0000e-003	7.5000e+001	1	3.9743e-066	1.2642e-075	4.6495e-055	2.4678e+001	1.8099e-003
2.0000e-003	8.0000e+001	1	9.3150e-053	1.8153e-060	9.9390e-044	2.3661e+001	1.7815e-003
2.0000e-003	8.5000e+001	1	5.4509e-040	1.9042e-046	4.2762e-033	2.2401e+001	1.7218e-003
2.0000e-003	9.0000e+001	1	9.2484e-029	3.4218e-034	8.1799e-024	2.0879e+001	1.6675e-003
2.0000e-003	9.5000e+001	1	9.1442e-020	1.6375e-023	3.9529e-016	1.9107e+001	1.5717e-003
2.0000e-003	1.0000e+002	1	3.5163e-013	1.2961e-015	1.3091e-010	1.7121e+001	1.4629e-003
2.0000e-003	1.0500e+002	1	1.1018e-009	3.1560e-010	4.9520e-007	1.4956e+001	1.2889e-003
2.0000e-003	1.1000e+002	1	9.2610e-006	9.9938e-007	9.3868e-005	1.2633e+001	1.0606e-003
3.0000e-003	7.0000e+001	1	3.7417e-077	5.2480e-088	4.8410e-066	2.5369e+001	2.8058e-003
3.0000e-003	7.5000e+001	1	3.8285e-069	4.0972e-079	1.5499e-058	2.4878e+001	2.7820e-003
3.0000e-003	8.0000e+001	1	1.5962e-059	2.8930e-068	6.4828e-050	2.4205e+001	2.7203e-003
3.0000e-003	8.5000e+001	1	6.1641e-049	2.8523e-056	9.1884e-041	2.3320e+001	2.6784e-003
3.0000e-003	9.0000e+001	1	6.1853e-038	3.3345e-044	1.7369e-031	2.2159e+001	2.5963e-003
3.0000e-003	9.5000e+001	1	1.0104e-027	5.9199e-033	5.7583e-023	2.0708e+001	2.5128e-003
3.0000e-003	1.0000e+002	1	2.8187e-019	6.1841e-023	9.8467e-016	1.8987e+001	2.3726e-003
3.0000e-003	1.0500e+002	1	5.7974e-013	2.2709e-015	1.8636e-010	1.7038e+001	2.2135e-003
3.0000e-003	1.1000e+002	1	1.3678e-008	3.9665e-010	5.6862e-007	1.4898e+001	1.9281e-003
4.0000e-003	7.0000e+001	1	3.3038e-070	1.3696e-079	2.4437e-061	2.4947e+001	3.7567e-003
4.0000e-003	7.5000e+001	1	1.8271e-065	1.0526e-074	1.6696e-056	2.4633e+001	3.7262e-003
4.0000e-003	8.0000e+001	1	2.5173e-059	4.6331e-068	1.4389e-050	2.4190e+001	3.6941e-003
4.0000e-003	8.5000e+001	1	1.0920e-051	1.6334e-059	1.4337e-043	2.3568e+001	3.6242e-003
4.0000e-003	9.0000e+001	1	1.0383e-042	2.2190e-049	1.0524e-035	2.2701e+001	3.5625e-003
4.0000e-003	9.5000e+001	1	3.7564e-033	5.6444e-039	1.3769e-027	2.1539e+001	3.4378e-003
4.0000e-003	1.0000e+002	1	3.2436e-024	8.5325e-029	5.0413e-020	2.0073e+001	3.3390e-003
4.0000e-003	1.0500e+002	1	7.7323e-017	5.1002e-020	1.0765e-013	1.8332e+001	3.1360e-003
4.0000e-003	1.1000e+002	1	2.4135e-011	1.9341e-013	3.5764e-009	1.6359e+001	2.8645e-003

Tabla 1. Medidas de BER estimado, factor Q y apertura del ojo. Configuración 2 para 1 span, mono canal y formato de modulación NRZ-OOK. Rango de SMF-28de 70 a 110 km. Rango de potencia de transmisión 1 a 4 mw.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Ptx	Longitud_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)
2.0000e-003	1.1000e+002	1	9.2610e-006	9.9938e-007	9.3868e-005	1.2633e+001	1.0606e-003
2.0000e-003	1.1100e+002	1	2.5565e-005	3.3720e-006	2.0678e-004	1.2150e+001	1.0057e-003
2.0000e-003	1.1200e+002	1	6.4432e-005	1.0209e-005	4.2463e-004	1.1661e+001	9.4766e-004
2.0000e-003	1.1300e+002	1	1.4931e-004	2.7964e-005	8.1747e-004	1.1166e+001	8.8896e-004
2.0000e-003	1.1400e+002	1	3.2048e-004	6.9929e-005	1.4838e-003	1.0664e+001	8.2676e-004
2.0000e-003	1.1500e+002	1	6.4114e-004	1.6081e-004	2.5512e-003	1.0157e+001	7.6045e-004
2.0000e-003	1.1600e+002	1	2.0497e-003	9.6237e-004	4.1740e-003	9.1589e+000	6.8797e-004
2.0000e-003	1.1700e+002	1	3.2732e-003	1.6440e-003	6.2607e-003	8.6884e+000	6.1055e-004
2.0000e-003	1.1800e+002	1	5.0245e-003	2.6828e-003	9.0786e-003	8.2126e+000	5.2777e-004
2.0000e-003	1.1900e+002	1	7.4365e-003	4.1965e-003	1.2761e-002	7.7316e+000	4.3923e-004
2.0000e-003	1.2000e+002	1	1.0643e-002	6.3136e-003	1.7431e-002	7.2454e+000	3.4453e-004
3.0000e-003	1.1000e+002	1	1.3678e-009	3.9665e-010	5.6862e-007	1.4898e+001	1.9281e-003
3.0000e-003	1.1100e+002	1	6.5320e-008	2.5833e-009	1.9368e-006	1.4449e+001	1.8662e-003
3.0000e-003	1.1200e+002	1	2.7408e-007	1.4411e-008	5.9454e-006	1.3994e+001	1.8003e-003
3.0000e-003	1.1300e+002	1	1.0185e-006	6.9509e-008	1.6572e-005	1.3533e+001	1.7303e-003
3.0000e-003	1.1400e+002	1	3.3845e-006	2.9332e-007	4.2301e-005	1.3066e+001	1.6558e-003
3.0000e-003	1.1500e+002	1	1.0132e-005	1.0927e-006	9.9498e-005	1.2592e+001	1.5764e-003
3.0000e-003	1.1600e+002	1	2.7563e-005	3.6311e-006	2.1728e-004	1.2112e+001	1.4916e-003
3.0000e-003	1.1700e+002	1	6.8575e-005	1.0847e-005	4.4264e-004	1.1626e+001	1.4014e-003
3.0000e-003	1.1800e+002	1	1.5728e-004	2.9406e-005	8.4679e-004	1.1133e+001	1.3065e-003
3.0000e-003	1.1900e+002	1	3.3450e-004	7.2859e-005	1.5281e-003	1.0635e+001	1.2081e-003
3.0000e-003	1.2000e+002	1	6.6418e-004	1.6631e-004	2.6151e-003	1.0130e+001	1.1030e-003
4.0000e-003	1.1000e+002	1	2.4135e-011	1.9341e-013	3.5764e-009	1.6359e+001	2.8645e-003
4.0000e-003	1.1100e+002	1	1.8437e-010	2.2127e-012	1.8193e-008	1.5941e+001	2.7934e-003
4.0000e-003	1.1200e+002	1	1.2103e-009	2.1118e-011	8.1235e-008	1.5515e+001	2.7084e-003
4.0000e-003	1.1300e+002	1	6.8706e-009	1.6938e-010	3.2095e-007	1.5082e+001	2.6173e-003
4.0000e-003	1.1400e+002	1	3.4050e-008	1.1549e-009	1.1335e-006	1.4642e+001	2.5258e-003
4.0000e-003	1.1500e+002	1	1.4834e-007	6.7487e-009	3.6031e-006	1.4195e+001	2.4386e-003
4.0000e-003	1.1600e+002	1	5.7342e-007	3.4185e-008	1.0409e-005	1.3741e+001	2.3458e-003
4.0000e-003	1.1700e+002	1	1.9785e-006	1.5118e-007	2.7456e-005	1.3281e+001	2.2472e-003
4.0000e-003	1.1800e+002	1	6.1504e-006	5.9024e-007	6.6710e-005	1.2814e+001	2.1419e-003
4.0000e-003	1.1900e+002	1	1.7332e-005	2.0496e-006	1.5005e-004	1.2341e+001	2.0297e-003
4.0000e-003	1.2000e+002	1	4.4641e-005	6.3922e-006	3.1463e-004	1.1861e+001	1.9101e-003

Tabla 2. Medidas de BER estimado, factor Q y apertura del ojo. Configuración 2 para 1 span, mono canal y formato de modulación NRZ-OOK. Rango de SMF-28de 110 a 120 km. Rango de potencia de transmisión 2 a 4 mw.

Anexo L: Configuración 3 mono canal, 1 span y formato de modulación NRZ-OOK.

Ptx	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)
1.0000e-003	7.0000e+001	1	9.6795e-067	3.3012e-076	4.5222e-055	2.4720e+001	8.8679e-004
1.0000e-003	7.5000e+001	1	1.0509e-048	5.1580e-056	2.8690e-040	2.3299e+001	8.6159e-004
1.0000e-003	8.0000e+001	1	4.2448e-034	3.3931e-040	2.6428e-028	2.1669e+001	8.3754e-004
1.0000e-003	8.5000e+001	1	3.9228e-023	1.7491e-027	4.9824e-019	1.9857e+001	7.9500e-004
1.0000e-003	9.0000e+001	1	2.8276e-015	4.5218e-018	2.6504e-012	1.7855e+001	7.4507e-004
1.0000e-003	9.5000e+001	1	5.7557e-009	1.0034e-011	5.1277e-008	1.5688e+001	6.6948e-004
1.0000e-003	1.0000e+002	1	1.5571e-006	1.2408e-007	2.4082e-005	1.3374e+001	5.6582e-004
1.0000e-003	1.0500e+002	1	2.2086e-004	4.5749e-005	1.1193e-003	1.0916e+001	4.3658e-004
1.0000e-003	1.1000e+002	1	6.0474e-003	3.4072e-003	1.0475e-002	7.9913e+000	2.5642e-004
2.0000e-003	7.0000e+001	1	5.6341e-107	1.3816e-121	3.8201e-088	2.6824e+001	1.8376e-003
2.0000e-003	7.5000e+001	1	4.3231e-083	1.3060e-094	2.2617e-068	2.5700e+001	1.7980e-003
2.0000e-003	8.0000e+001	1	7.1816e-062	1.2804e-070	5.9087e-051	2.4379e+001	1.7581e-003
2.0000e-003	8.5000e+001	1	3.2332e-044	3.6145e-051	1.5747e-036	2.2859e+001	1.7179e-003
2.0000e-003	9.0000e+001	1	1.8947e-030	3.3370e-036	3.2758e-025	2.1145e+001	1.6500e-003
2.0000e-003	9.5000e+001	1	2.2933e-020	3.4512e-024	1.4009e-016	1.9251e+001	1.5697e-003
2.0000e-003	1.0000e+002	1	2.4161e-013	9.0650e-016	1.0561e-010	1.7183e+001	1.4507e-003
2.0000e-003	1.0500e+002	1	1.0731e-009	3.2514e-010	5.0266e-007	1.4963e+001	1.2686e-003
2.0000e-003	1.1000e+002	1	9.8804e-006	1.1163e-006	9.9708e-005	1.2604e+001	1.0461e-003
3.0000e-003	7.0000e+001	1	2.8581e-137	9.5530e-156	3.5821e-113	2.7928e+001	2.7899e-003
3.0000e-003	7.5000e+001	1	4.6982e-110	4.2852e-125	1.8187e-090	2.6950e+001	2.7470e-003
3.0000e-003	8.0000e+001	1	1.5068e-084	2.8932e-096	1.8807e-069	2.5778e+001	2.6939e-003
3.0000e-003	8.5000e+001	1	2.1326e-062	3.2966e-071	2.5295e-051	2.4418e+001	2.6457e-003
3.0000e-003	9.0000e+001	1	2.8257e-044	2.7274e-051	1.5311e-036	2.2865e+001	2.5764e-003
3.0000e-003	9.5000e+001	1	2.4829e-030	4.2519e-036	4.3151e-025	2.1127e+001	2.4616e-003
3.0000e-003	1.0000e+002	1	3.1837e-020	5.0145e-024	1.9438e-016	1.9217e+001	2.3489e-003
3.0000e-003	1.0500e+002	1	3.1316e-013	1.2214e-015	1.2967e-010	1.7140e+001	2.1573e-003
3.0000e-003	1.1000e+002	1	1.2748e-009	3.9617e-010	5.6835e-007	1.4917e+001	1.8831e-003
4.0000e-003	7.0000e+001	1	1.2336e-163	1.6512e-185	6.0748e-135	2.8703e+001	3.7471e-003
4.0000e-003	7.5000e+001	1	1.1408e-133	8.9755e-152	8.1233e-110	2.7810e+001	3.6980e-003
4.0000e-003	8.0000e+001	1	1.4135e-104	5.8315e-119	8.6085e-086	2.6723e+001	3.6382e-003
4.0000e-003	8.5000e+001	1	1.2041e-078	1.3963e-089	1.5206e-064	2.5455e+001	3.5840e-003
4.0000e-003	9.0000e+001	1	5.8995e-057	3.8973e-065	7.6070e-047	2.4007e+001	3.5085e-003
4.0000e-003	9.5000e+001	1	9.7086e-040	1.6202e-046	8.0255e-033	2.2372e+001	3.3772e-003
4.0000e-003	1.0000e+002	1	6.5193e-027	4.6926e-032	3.4661e-022	2.0569e+001	3.2254e-003
4.0000e-003	1.0500e+002	1	8.7055e-018	4.1759e-021	2.3107e-014	1.8598e+001	3.0496e-003
4.0000e-003	1.1000e+002	1	1.3466e-011	1.0917e-013	2.5961e-009	1.6473e+001	2.7607e-003

Tabla 1. Medidas de BER estimado, factor Q y apertura del ojo. Configuración 3 para 1 span, mono canal y formato de modulación NRZ-OOK. Rango de SMF-28de 70 a 110 km. Rango de potencia de transmisión 1 a 4 mw.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Ptx	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)
2.0000e-003	1.1000e+002	1	9.8804e-006	1.1163e-006	9.9708e-005	1.2604e+001	1.0461e-003
2.0000e-003	1.1100e+002	1	2.7412e-005	3.7727e-006	2.1992e-004	1.2115e+001	9.9650e-004
2.0000e-003	1.1200e+002	1	6.9261e-005	1.1411e-005	4.5159e-004	1.1620e+001	9.4239e-004
2.0000e-003	1.1300e+002	1	1.6066e-004	3.1184e-005	8.6867e-004	1.1120e+001	8.8500e-004
2.0000e-003	1.1400e+002	1	3.4465e-004	7.7685e-005	1.5742e-003	1.0614e+001	8.2409e-004
2.0000e-003	1.1500e+002	1	1.2349e-003	5.3973e-004	2.6898e-003	9.6203e+000	7.5943e-004
2.0000e-003	1.1600e+002	1	2.0616e-003	9.7088e-004	4.1902e-003	9.1533e+000	6.9074e-004
2.0000e-003	1.1700e+002	1	3.3111e-003	1.7308e-003	6.1641e-003	8.6763e+000	6.1776e-004
2.0000e-003	1.1800e+002	1	5.0873e-003	2.8144e-003	8.9717e-003	8.1981e+000	5.3814e-004
2.0000e-003	1.1900e+002	1	7.5331e-003	4.3863e-003	1.2650e-002	7.7149e+000	4.5209e-004
2.0000e-003	1.2000e+002	1	1.0782e-002	6.5745e-003	1.7324e-002	7.2268e+000	3.5999e-004
3.0000e-003	1.1000e+002	1	1.2748e-008	3.9617e-010	5.6835e-007	1.4917e+001	1.8831e-003
3.0000e-003	1.1100e+002	1	6.3967e-008	2.7162e-009	1.9911e-006	1.4456e+001	1.8236e-003
3.0000e-003	1.1200e+002	1	2.7863e-007	1.5723e-008	6.2360e-006	1.3989e+001	1.7603e-003
3.0000e-003	1.1300e+002	1	1.0654e-006	7.7894e-008	1.7637e-005	1.3517e+001	1.6929e-003
3.0000e-003	1.1400e+002	1	3.6130e-006	3.3446e-007	4.5447e-005	1.3039e+001	1.6211e-003
3.0000e-003	1.1500e+002	1	1.0974e-005	1.2595e-006	1.0757e-004	1.2556e+001	1.5446e-003
3.0000e-003	1.1600e+002	1	3.0128e-005	4.2062e-006	2.3560e-004	1.2067e+001	1.4682e-003
3.0000e-003	1.1700e+002	1	7.5401e-005	1.2585e-005	4.8068e-004	1.1572e+001	1.3875e-003
3.0000e-003	1.1800e+002	1	1.7338e-004	3.4056e-005	9.1916e-004	1.1072e+001	1.3007e-003
3.0000e-003	1.1900e+002	1	3.6902e-004	8.4081e-005	1.6566e-003	1.0566e+001	1.2086e-003
3.0000e-003	1.2000e+002	1	1.2830e-003	5.6665e-004	2.7689e-003	9.5871e+000	1.1109e-003
4.0000e-003	1.1000e+002	1	1.3466e-011	1.0917e-013	2.5961e-009	1.6473e+001	2.7607e-003
4.0000e-003	1.1100e+002	1	1.2121e-010	1.5112e-012	1.4741e-008	1.6030e+001	2.6902e-003
4.0000e-003	1.1200e+002	1	9.0687e-009	1.6747e-011	7.1599e-008	1.5583e+001	2.6061e-003
4.0000e-003	1.1300e+002	1	5.7157e-008	1.5101e-010	3.0183e-007	1.5130e+001	2.5263e-003
4.0000e-003	1.1400e+002	1	3.0732e-008	1.1253e-009	1.1187e-006	1.4671e+001	2.4486e-003
4.0000e-003	1.1500e+002	1	1.4267e-007	7.0333e-009	3.6884e-006	1.4207e+001	2.3659e-003
4.0000e-003	1.1600e+002	1	5.7842e-007	3.7387e-008	1.0931e-005	1.3738e+001	2.2779e-003
4.0000e-003	1.1700e+002	1	2.0702e-006	1.7126e-007	2.9394e-005	1.3263e+001	2.1842e-003
4.0000e-003	1.1800e+002	1	6.6069e-006	6.8437e-007	7.2334e-005	1.2783e+001	2.0843e-003
4.0000e-003	1.1900e+002	1	1.8981e-005	2.4132e-006	1.6415e-004	1.2297e+001	1.9779e-003
4.0000e-003	1.2000e+002	1	4.9518e-005	7.5889e-006	3.4593e-004	1.1806e+001	1.8782e-003

Tabla 2. Medidas de BER estimado, factor Q y apertura del ojo. Configuración 3 para 1 span, mono canal y formato de modulación NRZ-OOK. Rango de SMF-28de 110 a 120 km. Rango de potencia de transmisión 2 a 4 mw.

Anexo M: Configuración 2 con 4 canales, 6 spans y formato de modulación NRZ-OOK

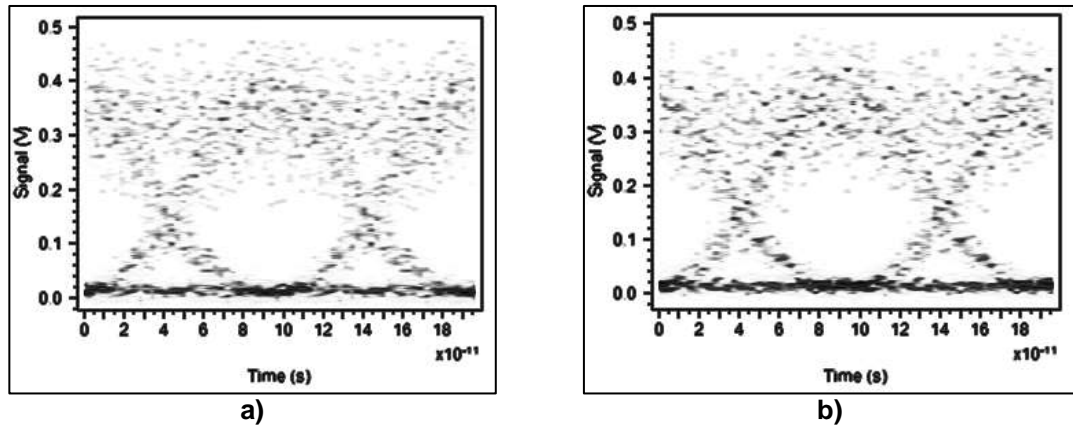


Figura 1. Diagrama del ojo del canal a) 18, b) 21. Configuración 2 con 4 canales, 6 spans y formato de modulación NRZ-OOK.

Anexo N: Configuración 3 con 4 canales, 6 spans y formato de modulación NRZ-OOK

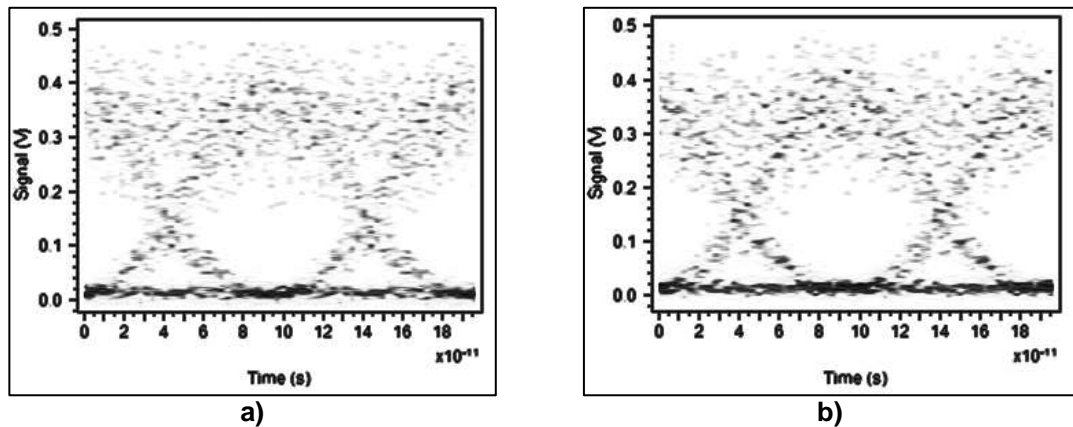


Figura 1. Diagrama del ojo del canal a) 18, b) 21. Configuración 3 con 4 canales y formato de modulación NRZ-OOK.

Anexo ñ: Configuración 2 mono canal, 1 span y formato de modulación NRZ-DPSK

Ptx	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)
1.0000e-003	8.0000e+001	1	3.0145e-086	9.1492e-099	1.0562e-072	2.5866e+001	1.8577e-003
1.0000e-003	8.5000e+001	1	7.6533e-064	2.6262e-073	2.4490e-054	2.4520e+001	1.8156e-003
1.0000e-003	9.0000e+001	1	6.5547e-046	8.5570e-053	7.6320e-039	2.3030e+001	1.7615e-003
1.0000e-003	9.5000e+001	1	5.8283e-032	6.4461e-037	6.4563e-027	2.1369e+001	1.6961e-003
1.0000e-003	1.0000e+002	1	1.1586e-021	6.2975e-025	2.1989e-018	1.9545e+001	1.6169e-003
1.0000e-003	1.0500e+002	1	1.9415e-014	1.4143e-016	2.4728e-012	1.7576e+001	1.4990e-003
1.0000e-003	1.1000e+002	1	1.5104e-009	6.8116e-011	3.0508e-008	1.5462e+001	1.3258e-003
1.0000e-003	1.1500e+002	1	2.4720e-006	3.5962e-007	1.5528e-005	1.3193e+001	1.0904e-003
1.0000e-003	1.2000e+002	1	3.0799e-004	9.7172e-005	9.0620e-004	1.0692e+001	7.8514e-004
1.0000e-003	1.2500e+002	1	7.3474e-003	3.8735e-003	1.3324e-002	7.7471e+000	1.4308e-004
1.0000e-003	1.3000e+002	1	2.5686e-002	1.6669e-002	3.8486e-002	5.7934e+000	4.2159e-004
2.0000e-003	8.0000e+001	1	1.4967e-134	9.9406e-153	8.3055e-117	2.7839e+001	3.8172e-003
2.0000e-003	8.5000e+001	1	1.1337e-107	2.8168e-123	6.1069e-090	2.6853e+001	3.7609e-003
2.0000e-003	9.0000e+001	1	5.6399e-081	8.9714e-093	1.7368e-068	2.5585e+001	3.6923e-003
2.0000e-003	9.5000e+001	1	2.1945e-058	2.5921e-068	8.4228e-049	2.4118e+001	3.6028e-003
2.0000e-003	1.0000e+002	1	3.6199e-041	1.7770e-047	1.2031e-034	2.2533e+001	3.4880e-003
2.0000e-003	1.0500e+002	1	4.6490e-028	2.3866e-032	1.0668e-023	2.0764e+001	3.3544e-003
2.0000e-003	1.1000e+002	1	8.7639e-019	1.5401e-021	5.3406e-016	1.8862e+001	3.1766e-003
2.0000e-003	1.1500e+002	1	2.0165e-012	3.5445e-014	1.1083e-010	1.6822e+001	2.8883e-003
2.0000e-003	1.2000e+002	1	3.3581e-009	2.6026e-009	3.9865e-007	1.4646e+001	2.5150e-003
2.0000e-003	1.2500e+002	1	1.7985e-005	3.6636e-006	8.1502e-005	1.2323e+001	2.0202e-003
2.0000e-003	1.3000e+002	1	1.0364e-003	3.9911e-004	2.5291e-003	9.7699e+000	1.3534e-003
3.0000e-003	8.0000e+001	1	1.0973e-171	9.3743e-194	5.2117e-146	2.8914e+001	5.7875e-003
3.0000e-003	8.5000e+001	1	1.2533e-136	3.9269e-155	2.5684e-119	2.7907e+001	5.7200e-003
3.0000e-003	9.0000e+001	1	2.7724e-109	9.5664e-125	1.7161e-092	2.6919e+001	5.6383e-003
3.0000e-003	9.5000e+001	1	1.2090e-080	2.6079e-094	9.7894e-068	2.5567e+001	5.5387e-003
3.0000e-003	1.0000e+002	1	6.2995e-058	3.2003e-066	1.0090e-049	2.4083e+001	5.4031e-003
3.0000e-003	1.0500e+002	1	2.2082e-040	4.0208e-046	1.9664e-034	2.2445e+001	5.2373e-003
3.0000e-003	1.1000e+002	1	1.9777e-027	1.7325e-031	2.9070e-023	2.0658e+001	5.0415e-003
3.0000e-003	1.1500e+002	1	2.7697e-018	7.5262e-021	1.1557e-015	1.8732e+001	4.7440e-003
3.0000e-003	1.2000e+002	1	4.4173e-012	9.2075e-014	2.0279e-010	1.6681e+001	4.3303e-003
3.0000e-003	1.2500e+002	1	5.4973e-009	4.7284e-009	5.8692e-007	1.4501e+001	3.7534e-003
3.0000e-003	1.3000e+002	1	2.3939e-005	5.1498e-006	1.0280e-004	1.2183e+001	2.9985e-003
4.0000e-003	8.0000e+001	1	1.7709e-199	3.4195e-224	1.5261e-172	2.9574e+001	7.7600e-003
4.0000e-003	8.5000e+001	1	4.9120e-165	1.7187e-191	4.2183e-139	2.8740e+001	7.6836e-003
4.0000e-003	9.0000e+001	1	2.6583e-130	3.4861e-148	1.3837e-113	2.7697e+001	7.5920e-003
4.0000e-003	9.5000e+001	1	3.0812e-100	2.5607e-114	1.4834e-086	2.6535e+001	7.4808e-003
4.0000e-003	1.0000e+002	1	2.0063e-073	6.9302e-084	1.3676e-062	2.5147e+001	7.3393e-003
4.0000e-003	1.0500e+002	1	1.1290e-051	4.8591e-059	5.7165e-044	2.3567e+001	7.1454e-003
4.0000e-003	1.1000e+002	1	2.2664e-035	3.2606e-040	2.4702e-030	2.1837e+001	6.9162e-003
4.0000e-003	1.1500e+002	1	8.3242e-024	3.5723e-027	2.4291e-020	1.9992e+001	6.6258e-003
4.0000e-003	1.2000e+002	1	8.4727e-016	5.2654e-018	1.3755e-013	1.8020e+001	6.1742e-003
4.0000e-003	1.2500e+002	1	1.9365e-009	7.4313e-012	4.6836e-009	1.5930e+001	5.5421e-003
4.0000e-003	1.3000e+002	1	6.1646e-007	7.7259e-008	4.4925e-006	1.3715e+001	4.7352e-003

Tabla 1. Medidas de BER estimado, factor Q y apertura del ojo. Configuración 2 para 1 span, mono canal y formato de modulación NRZ-DPSK. Rango de SMF-28de 80 a 130 km. Rango de potencia de transmisión 1 a 4 mw.

Ptx	smf_length_km	RUN#	Opt. SNR(dB)
1.000000e-003	8.000000e+001	1	1.710035e+001
1.000000e-003	8.500000e+001	1	1.637071e+001
1.000000e-003	9.000000e+001	1	1.546167e+001
1.000000e-003	9.500000e+001	1	1.437341e+001
1.000000e-003	1.000000e+002	1	1.312172e+001
1.000000e-003	1.050000e+002	1	1.173130e+001
1.000000e-003	1.100000e+002	1	1.023017e+001
1.000000e-003	1.150000e+002	1	8.645348e+000
1.000000e-003	1.200000e+002	1	6.999552e+000
1.000000e-003	1.250000e+002	1	5.310547e+000
1.000000e-003	1.300000e+002	1	3.591608e+000
2.000000e-003	8.000000e+001	1	1.798157e+001
2.000000e-003	8.500000e+001	1	1.751964e+001
2.000000e-003	9.000000e+001	1	1.690727e+001
2.000000e-003	9.500000e+001	1	1.612046e+001
2.000000e-003	1.000000e+002	1	1.515237e+001
2.000000e-003	1.050000e+002	1	1.400934e+001
2.000000e-003	1.100000e+002	1	1.270976e+001
2.000000e-003	1.150000e+002	1	1.128061e+001
2.000000e-003	1.200000e+002	1	9.749906e+000
2.000000e-003	1.250000e+002	1	8.143136e+000
2.000000e-003	1.300000e+002	1	6.481667e+000
3.000000e-003	8.000000e+001	1	1.833383e+001
3.000000e-003	8.500000e+001	1	1.799407e+001
3.000000e-003	9.000000e+001	1	1.753182e+001
3.000000e-003	9.500000e+001	1	1.691384e+001
3.000000e-003	1.000000e+002	1	1.612267e+001
3.000000e-003	1.050000e+002	1	1.515043e+001
3.000000e-003	1.100000e+002	1	1.400278e+001
3.000000e-003	1.150000e+002	1	1.270003e+001
3.000000e-003	1.200000e+002	1	1.126828e+001
3.000000e-003	1.250000e+002	1	9.735229e+000
3.000000e-003	1.300000e+002	1	8.126897e+000
4.000000e-003	8.000000e+001	1	1.853188e+001
4.000000e-003	8.500000e+001	1	1.826186e+001
4.000000e-003	9.000000e+001	1	1.789055e+001
4.000000e-003	9.500000e+001	1	1.738053e+001
4.000000e-003	1.000000e+002	1	1.671039e+001
4.000000e-003	1.050000e+002	1	1.586323e+001
4.000000e-003	1.100000e+002	1	1.483424e+001
4.000000e-003	1.150000e+002	1	1.363619e+001
4.000000e-003	1.200000e+002	1	1.229050e+001
4.000000e-003	1.250000e+002	1	1.082390e+001
4.000000e-003	1.300000e+002	1	9.264860e+000

Tabla 2. Medidas de OSNR. Configuración 2 para 1 span, mono canal y formato de modulación NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Rango de potencia de transmisión 1 a 4 mw.

Anexo O: Configuración 3 mono canal, 1 span y formato de modulación NRZ-DPSK.

Ptx	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)
1.0000e-003	8.0000e+001	1	2.2659e-083	1.7752e-095	1.4922e-071	2.5715e+001	1.8557e-003
1.0000e-003	8.5000e+001	1	5.2603e-063	1.6933e-073	4.1166e-052	2.4461e+001	1.8116e-003
1.0000e-003	9.0000e+001	1	2.4758e-045	3.7709e-052	2.0396e-038	2.2973e+001	1.7577e-003
1.0000e-003	9.5000e+001	1	8.5930e-032	8.7258e-037	1.0612e-026	2.1345e+001	1.6936e-003
1.0000e-003	1.0000e+002	1	1.2490e-021	5.8572e-025	2.6676e-018	1.9538e+001	1.6139e-003
1.0000e-003	1.0500e+002	1	1.8728e-014	1.3165e-016	2.4667e-012	1.7581e+001	1.4970e-003
1.0000e-003	1.1000e+002	1	1.4329e-009	6.2399e-011	2.9779e-008	1.5474e+001	1.3211e-003
1.0000e-003	1.1500e+002	1	2.3667e-006	3.3868e-007	1.5083e-005	1.3210e+001	1.0870e-003
1.0000e-003	1.2000e+002	1	3.0019e-004	9.4007e-005	8.8917e-004	1.0710e+001	7.8065e-004
1.0000e-003	1.2500e+002	1	7.3050e-003	3.8425e-003	1.3274e-002	7.7546e+000	1.4276e-004
1.0000e-003	1.3000e+002	1	2.5579e-002	1.6586e-002	3.8352e-002	5.8014e+000	4.1262e-004
2.0000e-003	8.0000e+001	1	4.3117e-128	4.9135e-146	9.4393e-106	2.7622e+001	3.8155e-003
2.0000e-003	8.5000e+001	1	1.0450e-101	4.0007e-116	1.6360e-086	2.6600e+001	3.7581e-003
2.0000e-003	9.0000e+001	1	4.1964e-077	2.0575e-088	1.7742e-066	2.5366e+001	3.6816e-003
2.0000e-003	9.5000e+001	1	1.2408e-057	8.6217e-067	7.1932e-048	2.4060e+001	3.5880e-003
2.0000e-003	1.0000e+002	1	8.3504e-041	2.8565e-047	4.3885e-034	2.2493e+001	3.4782e-003
2.0000e-003	1.0500e+002	1	4.7421e-028	2.4607e-032	1.2159e-023	2.0763e+001	3.3422e-003
2.0000e-003	1.1000e+002	1	7.4405e-019	1.0223e-021	5.5305e-016	1.8880e+001	3.1672e-003
2.0000e-003	1.1500e+002	1	1.6674e-012	2.5593e-014	1.0268e-010	1.6856e+001	2.8733e-003
2.0000e-003	1.2000e+002	1	2.9149e-009	2.1341e-009	3.6484e-007	1.4686e+001	2.5007e-003
2.0000e-003	1.2500e+002	1	1.6448e-005	3.2669e-006	7.6386e-005	1.2366e+001	1.9931e-003
2.0000e-003	1.3000e+002	1	9.9057e-004	3.7746e-004	2.4415e-003	9.8077e+000	1.3109e-003
3.0000e-003	8.0000e+001	1	7.1013e-153	1.3163e-172	1.3878e-133	2.8403e+001	5.7844e-003
3.0000e-003	8.5000e+001	1	5.7399e-130	1.0026e-147	7.3201e-108	2.7686e+001	5.7151e-003
3.0000e-003	9.0000e+001	1	1.8430e-103	1.2887e-118	1.4153e-085	2.6676e+001	5.6258e-003
3.0000e-003	9.5000e+001	1	8.5689e-078	3.1967e-089	2.1987e-066	2.5406e+001	5.5107e-003
3.0000e-003	1.0000e+002	1	6.1763e-057	9.7370e-067	3.2163e-047	2.4005e+001	5.3755e-003
3.0000e-003	1.0500e+002	1	3.6243e-040	4.2987e-046	4.8841e-034	2.2421e+001	5.2127e-003
3.0000e-003	1.1000e+002	1	1.4921e-027	1.2833e-031	2.5359e-023	2.0679e+001	5.0107e-003
3.0000e-003	1.1500e+002	1	1.8018e-018	3.0954e-021	1.1077e-015	1.8781e+001	4.7192e-003
3.0000e-003	1.2000e+002	1	3.1172e-012	5.6254e-014	1.6610e-010	1.6744e+001	4.2980e-003
3.0000e-003	1.2500e+002	1	4.3574e-009	3.4751e-009	5.0275e-007	1.4570e+001	3.7088e-003
3.0000e-003	1.3000e+002	1	2.0859e-005	4.3312e-006	9.2846e-005	1.2251e+001	2.9520e-003
4.0000e-003	8.0000e+001	1	5.5263e-173	1.2872e-194	1.0768e-150	2.8947e+001	7.7374e-003
4.0000e-003	8.5000e+001	1	1.2252e-150	1.5571e-170	2.4011e-125	2.8338e+001	7.6748e-003
4.0000e-003	9.0000e+001	1	2.7833e-123	1.7207e-140	2.3227e-102	2.7453e+001	7.5757e-003
4.0000e-003	9.5000e+001	1	4.4356e-095	8.2355e-109	3.3800e-081	2.6300e+001	7.4436e-003
4.0000e-003	1.0000e+002	1	1.1765e-071	1.9973e-082	1.0152e-059	2.5038e+001	7.2808e-003
4.0000e-003	1.0500e+002	1	4.0587e-051	1.1834e-058	2.5523e-043	2.3518e+001	7.0908e-003
4.0000e-003	1.1000e+002	1	1.2023e-035	5.1574e-041	5.6319e-030	2.1873e+001	6.8611e-003
4.0000e-003	1.1500e+002	1	3.9159e-024	1.1675e-027	1.7952e-020	2.0057e+001	6.5786e-003
4.0000e-003	1.2000e+002	1	4.4232e-016	2.0619e-018	9.8923e-014	1.8107e+001	6.1123e-003
4.0000e-003	1.2500e+002	1	1.2378e-009	4.0209e-012	3.5764e-009	1.6026e+001	5.4797e-003
4.0000e-003	1.3000e+002	1	4.6874e-007	5.4401e-008	3.7095e-006	1.3812e+001	4.6566e-003

Tabla 1. Medidas de BER estimada, factor Q y apertura del ojo. Configuración 3 para 1 span, mono canal y formato de modulación NRZ-DPSK. Rango de SMF-28de 70 a 110 km. Rango de potencia de transmisión 1 a 4 mw.

Ptx	smf_length_km	RUN#	Opt. SNR(dB)
1.000000e-003	8.000000e+001	1	1.706190e+001
1.000000e-003	8.500000e+001	1	1.633836e+001
1.000000e-003	9.000000e+001	1	1.543480e+001
1.000000e-003	9.500000e+001	1	1.435220e+001
1.000000e-003	1.000000e+002	1	1.310550e+001
1.000000e-003	1.050000e+002	1	1.171911e+001
1.000000e-003	1.100000e+002	1	1.022119e+001
1.000000e-003	1.150000e+002	1	8.638682e+000
1.000000e-003	1.200000e+002	1	6.994515e+000
1.000000e-003	1.250000e+002	1	5.306677e+000
1.000000e-003	1.300000e+002	1	3.588541e+000
2.000000e-003	8.000000e+001	1	1.788841e+001
2.000000e-003	8.500000e+001	1	1.743657e+001
2.000000e-003	9.000000e+001	1	1.683368e+001
2.000000e-003	9.500000e+001	1	1.605863e+001
2.000000e-003	1.000000e+002	1	1.510236e+001
2.000000e-003	1.050000e+002	1	1.397010e+001
2.000000e-003	1.100000e+002	1	1.268010e+001
2.000000e-003	1.150000e+002	1	1.125845e+001
2.000000e-003	1.200000e+002	1	9.733364e+000
2.000000e-003	1.250000e+002	1	8.130836e+000
2.000000e-003	1.300000e+002	1	6.472371e+000
3.000000e-003	8.000000e+001	1	1.818330e+001
3.000000e-003	8.500000e+001	1	1.785616e+001
3.000000e-003	9.000000e+001	1	1.740549e+001
3.000000e-003	9.500000e+001	1	1.680375e+001
3.000000e-003	1.000000e+002	1	1.603015e+001
3.000000e-003	1.050000e+002	1	1.507528e+001
3.000000e-003	1.100000e+002	1	1.394439e+001
3.000000e-003	1.150000e+002	1	1.265554e+001
3.000000e-003	1.200000e+002	1	1.123481e+001
3.000000e-003	1.250000e+002	1	9.710450e+000
3.000000e-003	1.300000e+002	1	8.108445e+000
4.000000e-003	8.000000e+001	1	1.832300e+001
4.000000e-003	8.500000e+001	1	1.806750e+001
4.000000e-003	9.000000e+001	1	1.770881e+001
4.000000e-003	9.500000e+001	1	1.721837e+001
4.000000e-003	1.000000e+002	1	1.657039e+001
4.000000e-003	1.050000e+002	1	1.574645e+001
4.000000e-003	1.100000e+002	1	1.474132e+001
4.000000e-003	1.150000e+002	1	1.356403e+001
4.000000e-003	1.200000e+002	1	1.223552e+001
4.000000e-003	1.250000e+002	1	1.078305e+001
4.000000e-003	1.300000e+002	1	9.234548e+000

Tabla 2. Medidas de OSNR. Configuración 3 para 1 span, mono canal y formato de modulación NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Rango de potencia de transmisión 1 a 4 mw.

Anexo P: Configuración 2 con 4 canales, 8 spans y formato de modulación NRZ-DPSK

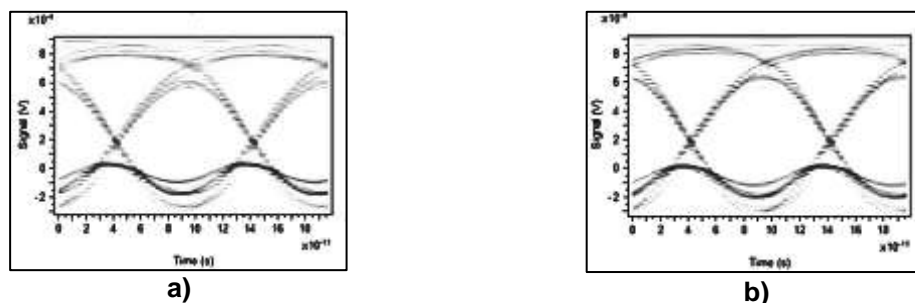


Figura 1. Diagrama del ojo del canal a) 18, b) 21. Configuración 2 con 4 canales, 8 spans y formato de modulación NRZ-DPSK.

Anexo Q: Configuración 3 con 4 canales, 8 spans y formato de modulación NRZ-DPSK

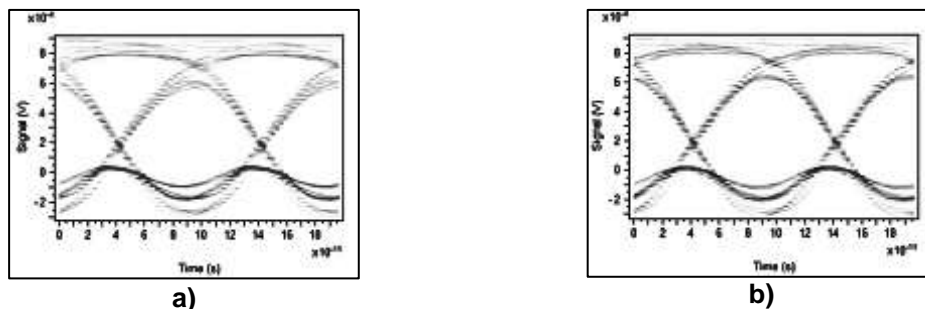


Figura 1. Diagrama del ojo del canal a) 18, b) 21. Configuración 3 con 4 canales, 8 spans y formato de modulación NRZ-DPSK.

Anexo R: Diodo Láser de Emisión Superficial con Cavidad Vertical - Vertical Cavity Surface Emitting Laser (VCSEL)

El Láser de emisión superficial con cavidad vertical, es un diodo semiconductor que emite luz en un haz cilíndrico vertical de la superficie de una oblea, y ofrece ventajas significativas cuando se compara con láser de emisión lateral comúnmente significativas cuando se compara con láser de emisión lateral comúnmente usados en la mayoría de comunicaciones por fibra óptica. Los VCSELs pueden ser construidos con GaAs, InGaAs [15].

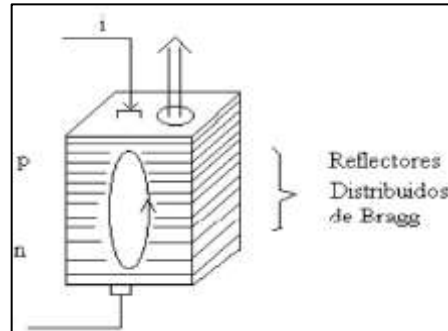


Figura 1. Estructura del VCSELs

Para el funcionamiento del VCSEL (Vertical Cavity Surface Emitting Laser) se requiere de una región activa de emisión de luz encerrada en un resonador que consta de dos espejos. En este caso, los espejos son parte de las películas epitaxiales, por lo que estas películas se superponen formando una pila [15]. Estos espejos son conocidos como reflectores distribuidos de Bragg (DBRs). Los reflectores distribuidos de Bragg (DBRs), llegan a formar espesor usando entre 40 a 60 películas en cada DBR produciéndose un espesor total de entre 40 y 60 películas en cada DBR, produciéndose un espesor total de $6\mu\text{m} - 8\mu\text{m}$. Para crear la unión p-n se necesita que un DBR este dopado para hacerlo semiconductor tipo n y el otro DBR tipo p.

Los VCSELs tienen alto rendimiento y bajo costo, algunas de sus características son [15]:

1. La estructura puede ser integrada en una configuración de arreglos de 2 dimensiones. La estructura puede ser integrada en una configuración de arreglos de 2 dimensiones.
2. Su haz circular y baja divergencia eliminan la necesidad de óptica correctiva.
3. Comercialmente la corriente de umbral de un VCSEL es de aproximadamente 4 mA.
4. Alcanza potencias ópticas del orden de 10 mW.
5. Su ancho espectral (DI) es de aproximadamente 1nm.
6. Su longitud de onda central es de aproximadamente 850 nm.
7. Se puede aplicar un VCSEL en transmisión de datos en el rango de velocidad de 100 Mbs a 10 Gbs.

Anexo S: Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato de modulación NRZ-OOK.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q	Q_lo	Q_hi	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	8.8226e-004
5.0000e+000	7.5000e+001	1	1.2554e-221	7.7266e-242	2.6315e-202	3.1757e+001	3.0326e+001	3.3189e+001	0.0000e+000	8.8161e-004
5.0000e+000	8.0000e+001	1	1.0005e-166	7.0077e-182	3.0792e-152	2.7495e+001	2.6256e+001	2.8735e+001	0.0000e+000	8.7180e-004
5.0000e+000	8.5000e+001	1	3.8962e-121	4.2948e-132	1.1666e-110	2.3374e+001	2.2321e+001	2.4428e+001	0.0000e+000	8.6122e-004
5.0000e+000	9.0000e+001	1	2.3846e-086	4.1702e-094	6.2281e-079	1.9660e+001	1.8773e+001	2.0546e+001	0.0000e+000	8.3654e-004
5.0000e+000	9.5000e+001	1	3.6240e-056	3.7662e-061	2.1109e-051	1.5747e+001	1.5037e+001	1.6457e+001	0.0000e+000	8.2706e-004
5.0000e+000	1.0000e+002	1	1.2471e-036	8.0373e-040	1.4052e-033	1.2587e+001	1.2019e+001	1.3154e+001	0.0000e+000	7.9584e-004
5.0000e+000	1.0500e+002	1	2.9217e-026	1.6749e-028	4.0749e-024	1.0537e+001	1.0062e+001	1.1012e+001	0.0000e+000	7.5679e-004
5.0000e+000	1.1000e+002	1	1.2766e-016	5.5410e-018	2.5709e-015	8.1928e+000	7.8234e+000	8.5621e+000	0.0000e+000	7.6078e-004
5.0000e+000	1.1500e+002	1	3.7797e-010	6.3236e-011	2.0955e-009	6.1539e+000	5.8765e+000	6.4314e+000	0.0000e+000	7.0329e-004
5.0000e+000	1.2000e+002	1	4.5654e-006	1.7691e-006	1.1338e-005	4.4368e+000	4.2368e+000	4.6368e+000	0.0000e+000	5.8024e-004
6.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	6.6087e-004
6.0000e+000	7.5000e+001	1	2.7304e-257	8.7173e-281	7.9046e-235	3.4243e+001	3.2700e+001	3.5787e+001	0.0000e+000	5.1018e-004
6.0000e+000	8.0000e+001	1	1.9999e-166	1.4929e-181	5.7907e-152	2.7470e+001	2.6232e+001	2.8709e+001	0.0000e+000	8.7435e-004
6.0000e+000	8.5000e+001	1	4.3085e-122	3.8780e-133	1.5658e-111	2.3468e+001	2.2410e+001	2.4526e+001	0.0000e+000	8.6054e-004
6.0000e+000	9.0000e+001	1	7.4071e-088	9.4132e-096	2.6251e-080	1.9835e+001	1.8941e+001	2.0729e+001	0.0000e+000	8.4035e-004
6.0000e+000	9.5000e+001	1	6.5792e-054	1.1024e-058	2.4275e-049	1.5414e+001	1.4719e+001	1.6109e+001	0.0000e+000	6.0889e-004
6.0000e+000	1.0000e+002	1	1.2599e-033	1.5302e-036	7.7453e-031	1.2028e+001	1.1486e+001	1.2571e+001	0.0000e+000	5.4119e-004
6.0000e+000	1.0500e+002	1	9.7720e-024	9.5272e-026	8.2036e-022	9.9753e+000	9.5256e+000	1.0425e+001	0.0000e+000	4.9170e-004
6.0000e+000	1.1000e+002	1	4.3160e-017	1.6974e-018	9.5510e-016	8.3222e+000	7.9470e+000	8.6974e+000	0.0000e+000	7.5840e-004
6.0000e+000	1.1500e+002	1	5.0192e-011	7.0004e-012	3.3114e-010	6.4664e+000	6.1748e+000	6.7579e+000	0.0000e+000	7.4769e-004
6.0000e+000	1.2000e+002	1	6.6640e-007	2.1773e-007	1.9482e-006	4.8348e+000	4.6168e+000	5.0528e+000	0.0000e+000	6.7273e-004
7.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.5000e+001	1	3.7893e-269	9.7800e-294	1.2145e-245	3.5031e+001	3.3452e+001	3.6610e+001	0.0000e+000	4.0420e-004
7.0000e+000	8.0000e+001	1	1.2911e-165	1.1444e-180	3.1724e-151	2.7402e+001	2.6167e+001	2.8638e+001	0.0000e+000	7.9822e-004
7.0000e+000	8.5000e+001	1	9.2059e-118	2.0741e-128	1.3918e-107	2.3040e+001	2.2002e+001	2.4079e+001	0.0000e+000	8.6960e-004
7.0000e+000	9.0000e+001	1	3.6719e-082	1.5585e-089	4.1090e-075	1.9164e+001	1.8300e+001	2.0028e+001	0.0000e+000	8.4778e-004
7.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0500e+002	1	1.7897e-024	1.4942e-026	1.7424e-022	1.0142e+001	9.6852e+000	1.0600e+001	0.0000e+000	4.8499e-004
7.0000e+000	1.1000e+002	1	1.6551e-017	5.9659e-019	3.9811e-016	8.4351e+000	8.0548e+000	8.8153e+000	0.0000e+000	7.6755e-004
7.0000e+000	1.1500e+002	1	3.9475e-011	5.3876e-012	2.6589e-010	6.5026e+000	6.2094e+000	6.7957e+000	0.0000e+000	7.5614e-004
7.0000e+000	1.2000e+002	1	7.4399e-007	2.4547e-007	2.1548e-006	4.8128e+000	4.5959e+000	5.0298e+000	0.0000e+000	7.0165e-004
8.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	7.5000e+001	1	4.2511e-265	2.5905e-289	5.9938e-242	3.4764e+001	3.3197e+001	3.6331e+001	0.0000e+000	4.0260e-004
8.0000e+000	8.0000e+001	1	8.6096e-166	7.3520e-181	2.1924e-151	2.7417e+001	2.6181e+001	2.8653e+001	0.0000e+000	8.7723e-004
8.0000e+000	8.5000e+001	1	1.4296e-118	2.7135e-129	2.5462e-108	2.3121e+001	2.2078e+001	2.4163e+001	0.0000e+000	8.6700e-004
8.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0500e+002	1	1.0157e-023	9.9377e-026	8.4982e-022	9.9715e+000	9.5219e+000	1.0421e+001	0.0000e+000	4.8081e-004
8.0000e+000	1.1000e+002	1	4.4562e-017	1.7577e-018	9.8340e-016	8.3184e+000	7.9434e+000	8.6935e+000	0.0000e+000	7.8017e-004
8.0000e+000	1.1500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.2000e+002	1	4.0625e-007	1.2701e-007	1.2387e-006	4.9323e+000	4.7100e+000	5.1547e+000	0.0000e+000	7.0825e-004
9.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	7.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	8.0000e+001	1	4.6560e-166	3.7571e-181	1.2515e-151	2.7439e+001	2.6202e+001	2.8676e+001	0.0000e+000	8.7879e-004
9.0000e+000	8.5000e+001	1	2.4797e-119	4.0059e-130	5.1524e-109	2.3196e+001	2.2151e+001	2.4242e+001	0.0000e+000	8.6654e-004
9.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0500e+002	1	8.7898e-024	8.4870e-026	7.4476e-022	9.9858e+000	9.5356e+000	1.0436e+001	0.0000e+000	4.8824e-004
9.0000e+000	1.1000e+002	1	2.9987e-017	1.1409e-018	6.8494e-016	8.3653e+000	7.9881e+000	8.7424e+000	0.0000e+000	7.6647e-004
9.0000e+000	1.1500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000

Tabla 1. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Numero_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.293489e+001
5.000000e+000	7.500000e+001	1	2.267061e+001
5.000000e+000	8.000000e+001	1	2.235506e+001
5.000000e+000	8.500000e+001	1	2.195892e+001
5.000000e+000	9.000000e+001	1	2.147710e+001
5.000000e+000	9.500000e+001	1	2.090196e+001
5.000000e+000	1.000000e+002	1	2.024339e+001
5.000000e+000	1.050000e+002	1	1.950241e+001
5.000000e+000	1.100000e+002	1	1.867169e+001
5.000000e+000	1.150000e+002	1	1.776506e+001
5.000000e+000	1.200000e+002	1	1.678951e+001
6.000000e+000	7.000000e+001	1	2.293489e+001
6.000000e+000	7.500000e+001	1	2.267061e+001
6.000000e+000	8.000000e+001	1	2.235506e+001
6.000000e+000	8.500000e+001	1	2.195892e+001
6.000000e+000	9.000000e+001	1	2.147710e+001
6.000000e+000	9.500000e+001	1	2.090196e+001
6.000000e+000	1.000000e+002	1	2.024339e+001
6.000000e+000	1.050000e+002	1	1.950241e+001
6.000000e+000	1.100000e+002	1	1.867169e+001
6.000000e+000	1.150000e+002	1	1.776506e+001
6.000000e+000	1.200000e+002	1	1.678951e+001
7.000000e+000	7.000000e+001	1	2.293489e+001
7.000000e+000	7.500000e+001	1	2.267061e+001
7.000000e+000	8.000000e+001	1	2.235506e+001
7.000000e+000	8.500000e+001	1	2.195892e+001
7.000000e+000	9.000000e+001	1	2.147710e+001
7.000000e+000	9.500000e+001	1	2.090196e+001
7.000000e+000	1.000000e+002	1	2.024339e+001
7.000000e+000	1.050000e+002	1	1.950241e+001
7.000000e+000	1.100000e+002	1	1.867169e+001
7.000000e+000	1.150000e+002	1	1.776506e+001
7.000000e+000	1.200000e+002	1	1.678951e+001
8.000000e+000	7.000000e+001	1	2.293489e+001
8.000000e+000	7.500000e+001	1	2.267061e+001
8.000000e+000	8.000000e+001	1	2.235506e+001
8.000000e+000	8.500000e+001	1	2.195892e+001
8.000000e+000	9.000000e+001	1	2.147710e+001
8.000000e+000	9.500000e+001	1	2.090196e+001
8.000000e+000	1.000000e+002	1	2.024339e+001
8.000000e+000	1.050000e+002	1	1.950241e+001
8.000000e+000	1.100000e+002	1	1.867169e+001
8.000000e+000	1.150000e+002	1	1.776506e+001
8.000000e+000	1.200000e+002	1	1.678951e+001
9.000000e+000	7.000000e+001	1	2.293489e+001
9.000000e+000	7.500000e+001	1	2.267061e+001
9.000000e+000	8.000000e+001	1	2.235506e+001
9.000000e+000	8.500000e+001	1	2.195892e+001
9.000000e+000	9.000000e+001	1	2.147710e+001
9.000000e+000	9.500000e+001	1	2.090196e+001
9.000000e+000	1.000000e+002	1	2.024339e+001
9.000000e+000	1.050000e+002	1	1.950241e+001
9.000000e+000	1.100000e+002	1	1.867169e+001
9.000000e+000	1.150000e+002	1	1.776506e+001
9.000000e+000	1.200000e+002	1	1.678951e+001

Tabla 2. Medidas de OSNR. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q	Q_lo	Q_hi	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7666e-003
5.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7662e-003
5.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7462e-003
5.0000e+000	8.5000e+001	1	2.6931e-240	3.1613e-262	2.4857e-219	3.3082e+001	3.1591e+001	3.4574e+001	0.0000e+000	1.7259e-003
5.0000e+000	9.0000e+001	1	8.2733e-171	2.4384e-186	5.8241e-156	2.7835e+001	2.6580e+001	2.9089e+001	0.0000e+000	1.6783e-003
5.0000e+000	9.5000e+001	1	3.6332e-101	2.7551e-110	1.9057e-092	2.1321e+001	2.0360e+001	2.2282e+001	0.0000e+000	1.6610e-003
5.0000e+000	1.0000e+002	1	4.1732e-050	1.5620e-054	7.1412e-046	1.4838e+001	1.4169e+001	1.5507e+001	0.0000e+000	1.6199e-003
5.0000e+000	1.0500e+002	1	1.8846e-032	2.9324e-035	9.1427e-030	1.1803e+001	1.1271e+001	1.2335e+001	0.0000e+000	1.5868e-003
5.0000e+000	1.1000e+002	1	8.3299e-031	1.8335e-033	2.9008e-028	1.1480e+001	1.0962e+001	1.1997e+001	0.0000e+000	1.5445e-003
5.0000e+000	1.1500e+002	1	8.9184e-018	3.0387e-019	2.2637e-016	8.5071e+000	8.1236e+000	8.8906e+000	0.0000e+000	1.4278e-003
5.0000e+000	1.2000e+002	1	2.4774e-009	4.9083e-010	1.1685e-008	5.8487e+000	5.5850e+000	6.1124e+000	0.0000e+000	1.1998e-003
6.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.3253e-003
6.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.0255e-003
6.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7515e-003
6.0000e+000	8.5000e+001	1	4.2023e-242	3.3625e-264	5.5948e-221	3.3207e+001	3.1710e+001	3.4705e+001	0.0000e+000	1.7245e-003
6.0000e+000	9.0000e+001	1	1.8020e-173	3.0204e-189	2.1758e-158	2.8054e+001	2.6789e+001	2.9318e+001	0.0000e+000	1.6857e-003
6.0000e+000	9.5000e+001	1	3.9951e-105	1.3096e-114	4.6715e-096	2.1743e+001	2.0763e+001	2.2724e+001	0.0000e+000	1.6239e-003
6.0000e+000	1.0000e+002	1	9.5275e-065	1.6126e-070	3.1455e-059	1.6951e+001	1.6186e+001	1.7715e+001	0.0000e+000	8.8522e-004
6.0000e+000	1.0500e+002	1	7.1044e-041	1.8692e-044	1.8848e-037	1.3336e+001	1.2735e+001	1.3938e+001	0.0000e+000	7.6752e-004
6.0000e+000	1.1000e+002	1	1.8605e-031	3.5701e-034	7.3871e-029	1.1609e+001	1.1085e+001	1.2132e+001	0.0000e+000	1.5328e-003
6.0000e+000	1.1500e+002	1	1.4125e-019	3.2995e-021	5.1432e-018	8.9753e+000	8.5707e+000	9.3800e+000	0.0000e+000	1.5323e-003
6.0000e+000	1.2000e+002	1	3.3276e-011	4.4721e-012	2.2746e-010	6.5282e+000	6.2339e+000	6.8225e+000	0.0000e+000	1.3928e-003
7.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	8.1542e-004
7.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7616e-003
7.0000e+000	8.5000e+001	1	4.3524e-233	2.3569e-254	9.3155e-213	3.2577e+001	3.1108e+001	3.4046e+001	0.0000e+000	1.7414e-003
7.0000e+000	9.0000e+001	1	1.3548e-161	2.8167e-176	1.4737e-147	2.7063e+001	2.5843e+001	2.8283e+001	0.0000e+000	1.7025e-003
7.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.1000e+002	1	1.7115e-032	2.6397e-035	8.3736e-030	1.1811e+001	1.1279e+001	1.2344e+001	0.0000e+000	1.5502e-003
7.0000e+000	1.1500e+002	1	1.0840e-019	2.4719e-021	4.0392e-018	9.0044e+000	8.5985e+000	9.4104e+000	0.0000e+000	1.5327e-003
7.0000e+000	1.2000e+002	1	3.4885e-011	4.7083e-012	2.3749e-010	6.5212e+000	6.2272e+000	6.8151e+000	0.0000e+000	1.4743e-003
8.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	8.1234e-004
8.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7565e-003
8.0000e+000	8.5000e+001	1	6.8391e-235	2.5262e-256	2.1101e-214	3.2704e+001	3.1230e+001	3.4178e+001	0.0000e+000	1.7378e-003
8.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0500e+002	1	3.7525e-044	4.9418e-048	1.9292e-040	1.3888e+001	1.3262e+001	1.4514e+001	0.0000e+000	9.6696e-004
8.0000e+000	1.1000e+002	1	3.7612e-031	7.6976e-034	1.4042e-028	1.1548e+001	1.1028e+001	1.2069e+001	0.0000e+000	1.5865e-003
8.0000e+000	1.1500e+002	1	3.0623e-019	7.6759e-021	1.0424e-017	8.8998e+000	8.4890e+000	9.2905e+000	0.0000e+000	1.5559e-003
8.0000e+000	1.2000e+002	1	1.4056e-011	1.7477e-012	1.0350e-010	6.6561e+000	6.3561e+000	6.9562e+000	0.0000e+000	1.4896e-003
9.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	7.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7595e-003
9.0000e+000	8.5000e+001	1	2.7202e-236	7.4659e-258	1.1148e-215	3.2802e+001	3.1324e+001	3.4281e+001	0.0000e+000	1.7369e-003
9.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0500e+002	1	3.9326e-044	5.2012e-048	2.0134e-040	1.3884e+001	1.3259e+001	1.4510e+001	0.0000e+000	9.8306e-004
9.0000e+000	1.1000e+002	1	2.8053e-031	5.5892e-034	1.0745e-028	1.1574e+001	1.1052e+001	1.2095e+001	0.0000e+000	1.5564e-003
9.0000e+000	1.1500e+002	1	2.7975e-019	6.9547e-021	9.5978e-018	8.8998e+000	8.4986e+000	9.3010e+000	0.0000e+000	1.5416e-003
9.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000

Tabla 3. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.335170e+001
5.000000e+000	7.500000e+001	1	2.320339e+001
5.000000e+000	8.000000e+001	1	2.302870e+001
5.000000e+000	8.500000e+001	1	2.279658e+001
5.000000e+000	9.000000e+001	1	2.250015e+001
5.000000e+000	9.500000e+001	1	2.212559e+001
5.000000e+000	1.000000e+002	1	2.168028e+001
5.000000e+000	1.050000e+002	1	2.115828e+001
5.000000e+000	1.100000e+002	1	2.053809e+001
5.000000e+000	1.150000e+002	1	1.982874e+001
5.000000e+000	1.200000e+002	1	1.902998e+001
6.000000e+000	7.000000e+001	1	2.335170e+001
6.000000e+000	7.500000e+001	1	2.320339e+001
6.000000e+000	8.000000e+001	1	2.302870e+001
6.000000e+000	8.500000e+001	1	2.279658e+001
6.000000e+000	9.000000e+001	1	2.250015e+001
6.000000e+000	9.500000e+001	1	2.212559e+001
6.000000e+000	1.000000e+002	1	2.168028e+001
6.000000e+000	1.050000e+002	1	2.115828e+001
6.000000e+000	1.100000e+002	1	2.053809e+001
6.000000e+000	1.150000e+002	1	1.982874e+001
6.000000e+000	1.200000e+002	1	1.902998e+001
7.000000e+000	7.000000e+001	1	2.335170e+001
7.000000e+000	7.500000e+001	1	2.320339e+001
7.000000e+000	8.000000e+001	1	2.302870e+001
7.000000e+000	8.500000e+001	1	2.279658e+001
7.000000e+000	9.000000e+001	1	2.250015e+001
7.000000e+000	9.500000e+001	1	2.212559e+001
7.000000e+000	1.000000e+002	1	2.168028e+001
7.000000e+000	1.050000e+002	1	2.115828e+001
7.000000e+000	1.100000e+002	1	2.053809e+001
7.000000e+000	1.150000e+002	1	1.982874e+001
7.000000e+000	1.200000e+002	1	1.902998e+001
8.000000e+000	7.000000e+001	1	2.335170e+001
8.000000e+000	7.500000e+001	1	2.320339e+001
8.000000e+000	8.000000e+001	1	2.302870e+001
8.000000e+000	8.500000e+001	1	2.279658e+001
8.000000e+000	9.000000e+001	1	2.250015e+001
8.000000e+000	9.500000e+001	1	2.212559e+001
8.000000e+000	1.000000e+002	1	2.168028e+001
8.000000e+000	1.050000e+002	1	2.115828e+001
8.000000e+000	1.100000e+002	1	2.053809e+001
8.000000e+000	1.150000e+002	1	1.982874e+001
8.000000e+000	1.200000e+002	1	1.902998e+001
9.000000e+000	7.000000e+001	1	2.335170e+001
9.000000e+000	7.500000e+001	1	2.320339e+001
9.000000e+000	8.000000e+001	1	2.302870e+001
9.000000e+000	8.500000e+001	1	2.279658e+001
9.000000e+000	9.000000e+001	1	2.250015e+001
9.000000e+000	9.500000e+001	1	2.212559e+001
9.000000e+000	1.000000e+002	1	2.168028e+001
9.000000e+000	1.050000e+002	1	2.115828e+001
9.000000e+000	1.100000e+002	1	2.053809e+001
9.000000e+000	1.150000e+002	1	1.982874e+001
9.000000e+000	1.200000e+002	1	1.902998e+001

Tabla 4. Medidas de OSNR. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q	Q_lo	Q_hi	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6521e-003
5.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6512e-003
5.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6214e-003
5.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.5925e-003
5.0000e+000	9.0000e+001	1	2.5762e-257	8.1810e-281	7.4964e-235	3.4245e+001	3.2701e+001	3.5789e+001	0.0000e+000	2.5221e-003
5.0000e+000	9.5000e+001	1	2.9725e-152	4.4775e-166	4.8699e-139	2.6257e+001	2.5073e+001	2.7441e+001	0.0000e+000	2.4987e-003
5.0000e+000	1.0000e+002	1	1.0450e-074	2.1492e-081	2.5872e-068	1.8249e+001	1.7427e+001	1.9072e+001	0.0000e+000	2.4433e-003
5.0000e+000	1.0500e+002	1	1.3614e-047	8.6674e-052	1.4021e-043	1.4444e+001	1.3793e+001	1.5096e+001	0.0000e+000	2.3908e-003
5.0000e+000	1.1000e+002	1	9.2796e-046	8.7032e-050	6.5991e-042	1.4150e+001	1.3512e+001	1.4788e+001	0.0000e+000	2.3363e-003
5.0000e+000	1.1500e+002	1	8.5638e-026	5.4163e-028	1.0873e-023	1.0435e+001	9.9647e+000	1.0906e+001	0.0000e+000	2.1673e-003
5.0000e+000	1.2000e+002	1	8.7808e-013	8.4965e-014	8.2170e-012	7.0526e+000	6.7346e+000	7.3705e+000	0.0000e+000	1.8356e-003
6.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.9937e-003
6.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.5464e-003
6.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6293e-003
6.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.5903e-003
6.0000e+000	9.0000e+001	1	2.8796e-261	3.9548e-285	1.8672e-238	3.4510e+001	3.2954e+001	3.6065e+001	0.0000e+000	2.5328e-003
6.0000e+000	9.5000e+001	1	3.9702e-144	3.3481e-157	1.2535e-131	2.5536e+001	2.4384e+001	2.6687e+001	0.0000e+000	1.5655e-003
6.0000e+000	1.0000e+002	1	1.4143e-096	2.8356e-105	2.9285e-088	2.0820e+001	1.9882e+001	2.1759e+001	0.0000e+000	1.3424e-003
6.0000e+000	1.0500e+002	1	2.0607e-060	8.7262e-066	2.8315e-055	1.6353e+001	1.5616e+001	1.7091e+001	0.0000e+000	1.1671e-003
6.0000e+000	1.1000e+002	1	1.6638e-046	1.3328e-050	1.3757e-042	1.4271e+001	1.3627e+001	1.4914e+001	0.0000e+000	2.3122e-003
6.0000e+000	1.1500e+002	1	1.8617e-028	6.7219e-031	4.0394e-026	1.1002e+001	1.0506e+001	1.1498e+001	0.0000e+000	2.3218e-003
6.0000e+000	1.2000e+002	1	1.0503e-015	5.5211e-017	1.7613e-014	7.9353e+000	7.5775e+000	8.2930e+000	0.0000e+000	2.1283e-003
7.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.2332e-003
7.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6435e-003
7.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6144e-003
7.0000e+000	9.0000e+001	1	5.1947e-243	3.4285e-265	8.3139e-222	3.3270e+001	3.1770e+001	3.4770e+001	0.0000e+000	2.5591e-003
7.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.1000e+002	1	3.5051e-048	1.9703e-052	4.0661e-044	1.4538e+001	1.3882e+001	1.5193e+001	0.0000e+000	2.3379e-003
7.0000e+000	1.1500e+002	1	1.4458e-028	5.1010e-031	3.2071e-026	1.1025e+001	1.0528e+001	1.1522e+001	0.0000e+000	2.3133e-003
7.0000e+000	1.2000e+002	1	1.0483e-015	5.5094e-017	1.7582e-014	7.9355e+000	7.5777e+000	8.2933e+000	0.0000e+000	2.2586e-003
8.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.2288e-003
8.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6359e-003
8.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6107e-003
8.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0500e+002	1	1.2363e-059	6.1717e-065	1.4514e-054	1.6244e+001	1.5511e+001	1.6976e+001	0.0000e+000	1.1321e-003
8.0000e+000	1.1000e+002	1	7.4665e-046	6.8644e-050	5.4119e-042	1.4166e+001	1.3527e+001	1.4804e+001	0.0000e+000	2.3988e-003
8.0000e+000	1.1500e+002	1	1.2438e-027	5.3430e-030	2.2859e-025	1.0830e+001	1.0342e+001	1.1318e+001	0.0000e+000	2.3575e-003
8.0000e+000	1.2000e+002	1	3.2875e-016	1.5550e-017	6.0981e-015	8.0782e+000	7.7140e+000	8.4424e+000	0.0000e+000	2.2770e-003
9.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	7.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6407e-003
9.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6091e-003
9.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.1000e+002	1	7.3043e-046	6.7018e-050	5.3046e-042	1.4167e+001	1.3529e+001	1.4806e+001	0.0000e+000	2.3507e-003
9.0000e+000	1.1500e+002	1	9.5546e-028	4.0064e-030	1.7969e-025	1.0854e+001	1.0365e+001	1.1343e+001	0.0000e+000	2.3323e-003
9.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000

Tabla 5. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.349873e+001
5.000000e+000	7.500000e+001	1	2.339534e+001
5.000000e+000	8.000000e+001	1	2.327724e+001
5.000000e+000	8.500000e+001	1	2.311456e+001
5.000000e+000	9.000000e+001	1	2.290155e+001
5.000000e+000	9.500000e+001	1	2.262306e+001
5.000000e+000	1.000000e+002	1	2.228752e+001
5.000000e+000	1.050000e+002	1	2.188729e+001
5.000000e+000	1.100000e+002	1	2.139350e+001
5.000000e+000	1.150000e+002	1	2.081202e+001
5.000000e+000	1.200000e+002	1	2.013649e+001
6.000000e+000	7.000000e+001	1	2.349873e+001
6.000000e+000	7.500000e+001	1	2.339534e+001
6.000000e+000	8.000000e+001	1	2.327724e+001
6.000000e+000	8.500000e+001	1	2.311456e+001
6.000000e+000	9.000000e+001	1	2.290155e+001
6.000000e+000	9.500000e+001	1	2.262306e+001
6.000000e+000	1.000000e+002	1	2.228752e+001
6.000000e+000	1.050000e+002	1	2.188729e+001
6.000000e+000	1.100000e+002	1	2.139350e+001
6.000000e+000	1.150000e+002	1	2.081202e+001
6.000000e+000	1.200000e+002	1	2.013649e+001
7.000000e+000	7.000000e+001	1	2.349873e+001
7.000000e+000	7.500000e+001	1	2.339534e+001
7.000000e+000	8.000000e+001	1	2.327724e+001
7.000000e+000	8.500000e+001	1	2.311456e+001
7.000000e+000	9.000000e+001	1	2.290155e+001
7.000000e+000	9.500000e+001	1	2.262306e+001
7.000000e+000	1.000000e+002	1	2.228752e+001
7.000000e+000	1.050000e+002	1	2.188729e+001
7.000000e+000	1.100000e+002	1	2.139350e+001
7.000000e+000	1.150000e+002	1	2.081202e+001
7.000000e+000	1.200000e+002	1	2.013649e+001
8.000000e+000	7.000000e+001	1	2.349873e+001
8.000000e+000	7.500000e+001	1	2.339534e+001
8.000000e+000	8.000000e+001	1	2.327724e+001
8.000000e+000	8.500000e+001	1	2.311456e+001
8.000000e+000	9.000000e+001	1	2.290155e+001
8.000000e+000	9.500000e+001	1	2.262306e+001
8.000000e+000	1.000000e+002	1	2.228752e+001
8.000000e+000	1.050000e+002	1	2.188729e+001
8.000000e+000	1.100000e+002	1	2.139350e+001
8.000000e+000	1.150000e+002	1	2.081202e+001
8.000000e+000	1.200000e+002	1	2.013649e+001
9.000000e+000	7.000000e+001	1	2.349873e+001
9.000000e+000	7.500000e+001	1	2.339534e+001
9.000000e+000	8.000000e+001	1	2.327724e+001
9.000000e+000	8.500000e+001	1	2.311456e+001
9.000000e+000	9.000000e+001	1	2.290155e+001
9.000000e+000	9.500000e+001	1	2.262306e+001
9.000000e+000	1.000000e+002	1	2.228752e+001
9.000000e+000	1.050000e+002	1	2.188729e+001
9.000000e+000	1.100000e+002	1	2.139350e+001
9.000000e+000	1.150000e+002	1	2.081202e+001
9.000000e+000	1.200000e+002	1	2.013649e+001

Tabla 6. Medidas de OSNR. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q	Q_lo	Q_hi	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5387e-003
5.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5357e-003
5.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4974e-003
5.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4611e-003
5.0000e+000	9.0000e+001	1	1.4110e-243	8.2589e-266	2.5329e-222	3.3309e+001	3.1808e+001	3.4811e+001	0.0000e+000	3.3440e-003
5.0000e+000	9.5000e+001	1	2.1463e-157	1.0870e-171	9.9674e-144	2.6703e+001	2.5500e+001	2.7907e+001	0.0000e+000	3.2602e-003
5.0000e+000	1.0000e+002	1	1.4501e-100	1.2489e-109	6.7344e-092	2.1256e+001	2.0298e+001	2.2214e+001	0.0000e+000	3.2676e-003
5.0000e+000	1.0500e+002	1	2.6336e-063	6.0468e-069	6.4959e-058	1.6754e+001	1.5999e+001	1.7510e+001	0.0000e+000	3.2000e-003
5.0000e+000	1.1000e+002	1	1.0641e-040	2.9053e-044	2.7248e-037	1.3306e+001	1.2706e+001	1.3906e+001	0.0000e+000	3.1566e-003
5.0000e+000	1.1500e+002	1	2.5243e-034	2.6462e-037	1.7864e-031	1.2160e+001	1.1612e+001	1.2709e+001	0.0000e+000	2.9146e-003
5.0000e+000	1.2000e+002	1	1.6769e-016	7.4611e-018	3.2979e-015	8.1599e+000	7.7920e+000	8.5277e+000	0.0000e+000	2.4903e-003
6.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6662e-003
6.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.0729e-003
6.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5075e-003
6.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4581e-003
6.0000e+000	9.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.3819e-003
6.0000e+000	9.5000e+001	1	4.4836e-193	1.1766e-210	2.8789e-176	2.9617e+001	2.8282e+001	3.0952e+001	0.0000e+000	2.1023e-003
6.0000e+000	1.0000e+002	1	1.5701e-129	2.9214e-141	2.5750e-118	2.4186e+001	2.3095e+001	2.5276e+001	0.0000e+000	1.8100e-003
6.0000e+000	1.0500e+002	1	8.5632e-081	4.8554e-088	7.2655e-074	1.9000e+001	1.8143e+001	1.9856e+001	0.0000e+000	1.5795e-003
6.0000e+000	1.1000e+002	1	2.4426e-062	6.8818e-068	4.9544e-057	1.6621e+001	1.5872e+001	1.7371e+001	0.0000e+000	3.0966e-003
6.0000e+000	1.1500e+002	1	9.0002e-038	4.5584e-041	1.2767e-034	1.2793e+001	1.2216e+001	1.3369e+001	0.0000e+000	3.1149e-003
6.0000e+000	1.2000e+002	1	1.5697e-020	3.0013e-022	6.9214e-019	9.2141e+000	8.7987e+000	9.6295e+000	0.0000e+000	2.8785e-003
7.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.6575e-003
7.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5256e-003
7.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4885e-003
7.0000e+000	9.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4176e-003
7.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.1000e+002	1	1.0589e-064	1.8096e-070	3.4635e-059	1.6944e+001	1.6180e+001	1.7708e+001	0.0000e+000	3.1307e-003
7.0000e+000	1.1500e+002	1	6.3342e-038	3.1065e-041	9.2659e-035	1.2820e+001	1.2242e+001	1.3398e+001	0.0000e+000	3.0978e-003
7.0000e+000	1.2000e+002	1	1.5014e-020	2.8591e-022	6.6460e-019	9.2189e+000	8.8032e+000	9.6345e+000	0.0000e+000	3.0532e-003
8.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.6520e-003
8.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5156e-003
8.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4855e-003
8.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0500e+002	1	2.2780e-079	1.7465e-086	1.4486e-072	1.8827e+001	1.7978e+001	1.9676e+001	0.0000e+000	1.5334e-003
8.0000e+000	1.1000e+002	1	2.5554e-061	8.9325e-067	4.2175e-056	1.6480e+001	1.5737e+001	1.7223e+001	0.0000e+000	3.2168e-003
8.0000e+000	1.1500e+002	1	1.6671e-036	1.1033e-039	1.8312e-033	1.2564e+001	1.1997e+001	1.3130e+001	0.0000e+000	3.1629e-003
8.0000e+000	1.2000e+002	1	3.6744e-021	6.1543e-023	1.8388e-019	9.3686e+000	8.9462e+000	9.7910e+000	0.0000e+000	3.0689e-003
9.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	7.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5223e-003
9.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4832e-003
9.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.1000e+002	1	3.0136e-061	1.0695e-066	4.9023e-056	1.6470e+001	1.5727e+001	1.7213e+001	0.0000e+000	3.1492e-003
9.0000e+000	1.1500e+002	1	1.0907e-036	6.9430e-040	1.2434e-033	1.2597e+001	1.2029e+001	1.3165e+001	0.0000e+000	3.1254e-003
9.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000

Tabla 7. BER estimada, Factor Q estimado, apertura del ojo. con un equalizador FFE-NL en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.357308e+001
5.000000e+000	7.500000e+001	1	2.349356e+001
5.000000e+000	8.000000e+001	1	2.340589e+001
5.000000e+000	8.500000e+001	1	2.328153e+001
5.000000e+000	9.000000e+001	1	2.311603e+001
5.000000e+000	9.500000e+001	1	2.289388e+001
5.000000e+000	1.000000e+002	1	2.262527e+001
5.000000e+000	1.050000e+002	1	2.230263e+001
5.000000e+000	1.100000e+002	1	2.189313e+001
5.000000e+000	1.150000e+002	1	2.140131e+001
5.000000e+000	1.200000e+002	1	2.081663e+001
6.000000e+000	7.000000e+001	1	2.357308e+001
6.000000e+000	7.500000e+001	1	2.349356e+001
6.000000e+000	8.000000e+001	1	2.340589e+001
6.000000e+000	8.500000e+001	1	2.328153e+001
6.000000e+000	9.000000e+001	1	2.311603e+001
6.000000e+000	9.500000e+001	1	2.289388e+001
6.000000e+000	1.000000e+002	1	2.262527e+001
6.000000e+000	1.050000e+002	1	2.230263e+001
6.000000e+000	1.100000e+002	1	2.189313e+001
6.000000e+000	1.150000e+002	1	2.140131e+001
6.000000e+000	1.200000e+002	1	2.081663e+001
7.000000e+000	7.000000e+001	1	2.357308e+001
7.000000e+000	7.500000e+001	1	2.349356e+001
7.000000e+000	8.000000e+001	1	2.340589e+001
7.000000e+000	8.500000e+001	1	2.328153e+001
7.000000e+000	9.000000e+001	1	2.311603e+001
7.000000e+000	9.500000e+001	1	2.289388e+001
7.000000e+000	1.000000e+002	1	2.262527e+001
7.000000e+000	1.050000e+002	1	2.230263e+001
7.000000e+000	1.100000e+002	1	2.189313e+001
7.000000e+000	1.150000e+002	1	2.140131e+001
7.000000e+000	1.200000e+002	1	2.081663e+001
8.000000e+000	7.000000e+001	1	2.357308e+001
8.000000e+000	7.500000e+001	1	2.349356e+001
8.000000e+000	8.000000e+001	1	2.340589e+001
8.000000e+000	8.500000e+001	1	2.328153e+001
8.000000e+000	9.000000e+001	1	2.311603e+001
8.000000e+000	9.500000e+001	1	2.289388e+001
8.000000e+000	1.000000e+002	1	2.262527e+001
8.000000e+000	1.050000e+002	1	2.230263e+001
8.000000e+000	1.100000e+002	1	2.189313e+001
8.000000e+000	1.150000e+002	1	2.140131e+001
8.000000e+000	1.200000e+002	1	2.081663e+001
9.000000e+000	7.000000e+001	1	2.357308e+001
9.000000e+000	7.500000e+001	1	2.349356e+001
9.000000e+000	8.000000e+001	1	2.340589e+001
9.000000e+000	8.500000e+001	1	2.328153e+001
9.000000e+000	9.000000e+001	1	2.311603e+001
9.000000e+000	9.500000e+001	1	2.289388e+001
9.000000e+000	1.000000e+002	1	2.262527e+001
9.000000e+000	1.050000e+002	1	2.230263e+001
9.000000e+000	1.100000e+002	1	2.189313e+001
9.000000e+000	1.150000e+002	1	2.140131e+001
9.000000e+000	1.200000e+002	1	2.081663e+001

Tabla 8. Medidas de OSNR. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Anexo T: Configuración 5 mono canal, con un ecualizador DFE en el lugar del receptor y formato de modulación NRZ-OOK.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q	Q_lo	Q_hi	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	8.8292e-004
5.0000e+000	7.5000e+001	1	7.7659e-278	3.1736e-303	1.4494e-253	3.5597e+001	3.3992e+001	3.7202e+001	0.0000e+000	8.7788e-004
5.0000e+000	8.0000e+001	1	2.6794e-168	1.3447e-183	1.1340e-153	2.7626e+001	2.6381e+001	2.8872e+001	0.0000e+000	8.7497e-004
5.0000e+000	8.5000e+001	1	3.1615e-120	4.2254e-131	7.8740e-110	2.3285e+001	2.2235e+001	2.4335e+001	0.0000e+000	8.6586e-004
5.0000e+000	9.0000e+001	1	4.4216e-072	1.5855e-078	6.4347e-066	1.7916e+001	1.7108e+001	1.8724e+001	0.0000e+000	8.3886e-004
5.0000e+000	9.5000e+001	1	2.1309e-055	2.6058e-060	1.0624e-050	1.5634e+001	1.4929e+001	1.6339e+001	0.0000e+000	8.3306e-004
5.0000e+000	1.0000e+002	1	3.7310e-033	5.0053e-036	2.0858e-030	1.1938e+001	1.1400e+001	1.2477e+001	0.0000e+000	8.0309e-004
5.0000e+000	1.0500e+002	1	5.2055e-009	1.1024e-009	2.3036e-008	5.7239e+000	5.4658e+000	5.9819e+000	0.0000e+000	4.8973e-004
5.0000e+000	1.1000e+002	1	8.4516e-009	1.8694e-009	3.5878e-008	5.6410e+000	5.3867e+000	5.8954e+000	0.0000e+000	6.8200e-004
5.0000e+000	1.1500e+002	1	2.4950e-008	6.0807e-009	9.6536e-008	5.4517e+000	5.2059e+000	5.6974e+000	0.0000e+000	7.3910e-004
5.0000e+000	1.2000e+002	1	3.7385e-008	9.4471e-009	1.3973e-007	5.3793e+000	5.1368e+000	5.6218e+000	0.0000e+000	6.8273e-004
6.0000e+000	7.0000e+001	1	2.2629e-130	3.5230e-142	4.4010e-119	2.4266e+001	2.3172e+001	2.5360e+001	0.0000e+000	6.6724e-004
6.0000e+000	7.5000e+001	1	8.1064e-036	6.2016e-039	7.7524e-033	1.2438e+001	1.1877e+001	1.2999e+001	0.0000e+000	4.1247e-004
6.0000e+000	8.0000e+001	1	1.7377e-171	4.4360e-187	1.4034e-156	2.7891e+001	2.6633e+001	2.9148e+001	0.0000e+000	8.7368e-004
6.0000e+000	8.5000e+001	1	4.2405e-120	5.8228e-131	1.0292e-109	2.3272e+001	2.2232e+001	2.4321e+001	0.0000e+000	8.5962e-004
6.0000e+000	9.0000e+001	1	1.1246e-087	1.4852e-095	3.8420e-080	1.9814e+001	1.8921e+001	2.0707e+001	0.0000e+000	8.4302e-004
6.0000e+000	9.5000e+001	1	1.2120e-048	6.1800e-053	1.5432e-044	1.4610e+001	1.3951e+001	1.5269e+001	0.0000e+000	8.3271e-004
6.0000e+000	1.0000e+002	1	6.3069e-011	8.9795e-012	4.0799e-010	6.4318e+000	6.1418e+000	6.7217e+000	0.0000e+000	5.4238e-004
6.0000e+000	1.0500e+002	1	4.7607e-009	1.0002e-009	2.1229e-008	5.7390e+000	5.4803e+000	5.9978e+000	0.0000e+000	4.9663e-004
6.0000e+000	1.1000e+002	1	6.1584e-015	3.8012e-016	8.8573e-014	7.7127e+000	7.3650e+000	8.0604e+000	0.0000e+000	7.6491e-004
6.0000e+000	1.1500e+002	1	2.0812e-010	3.2998e-011	1.2147e-009	6.2478e+000	5.9661e+000	6.5295e+000	0.0000e+000	7.4562e-004
6.0000e+000	1.2000e+002	1	4.8276e-009	1.0155e-009	2.1502e-008	5.7367e+000	5.4780e+000	5.9953e+000	0.0000e+000	7.1283e-004
7.0000e+000	7.0000e+001	1	2.8760e-106	7.4006e-116	4.2386e-097	2.1864e+001	2.0878e+001	2.2849e+001	0.0000e+000	6.0718e-004
7.0000e+000	7.5000e+001	1	2.9711e-048	1.6449e-052	3.4969e-044	1.4549e+001	1.3893e+001	1.5205e+001	0.0000e+000	4.4693e-004
7.0000e+000	8.0000e+001	1	1.1932e-133	9.2729e-146	4.5082e-122	2.4574e+001	2.3466e+001	2.5682e+001	0.0000e+000	8.7494e-004
7.0000e+000	8.5000e+001	1	7.5494e-104	3.2432e-113	6.8169e-095	2.1608e+001	2.0634e+001	2.2582e+001	0.0000e+000	8.6010e-004
7.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.5000e+001	1	1.8140e-053	3.3360e-058	6.1229e-049	1.5348e+001	1.4656e+001	1.6040e+001	0.0000e+000	8.2570e-004
7.0000e+000	1.0000e+002	1	1.4607e-013	1.2015e-014	1.5965e-012	7.2980e+000	6.9690e+000	7.6270e+000	0.0000e+000	5.7673e-004
7.0000e+000	1.0500e+002	1	4.1131e-011	5.6345e-012	2.7606e-010	6.4964e+000	6.2035e+000	6.7893e+000	0.0000e+000	5.3949e-004
7.0000e+000	1.1000e+002	1	3.5492e-010	5.9045e-011	1.9784e-009	6.1639e+000	5.8860e+000	6.4418e+000	0.0000e+000	7.2408e-004
7.0000e+000	1.1500e+002	1	2.7618e-009	5.5255e-010	1.2905e-008	5.8306e+000	5.5677e+000	6.0934e+000	0.0000e+000	7.8525e-004
7.0000e+000	1.2000e+002	1	7.0596e-007	2.3183e-007	2.0538e-006	4.8233e+000	4.6059e+000	5.0408e+000	0.0000e+000	7.4665e-004
8.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	7.5000e+001	1	1.0673e-042	1.9108e-046	4.0911e-039	1.3646e+001	1.3031e+001	1.4261e+001	0.0000e+000	4.2003e-004
8.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	8.5000e+001	1	2.9749e-121	3.1988e-132	9.1217e-111	2.3386e+001	2.2332e+001	2.4440e+001	0.0000e+000	8.6070e-004
8.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.1000e+002	1	1.9282e-010	3.0362e-011	1.1328e-009	6.2597e+000	5.9775e+000	6.5419e+000	0.0000e+000	7.2351e-004
8.0000e+000	1.1500e+002	1	1.3211e-009	2.4737e-010	6.5769e-009	5.9524e+000	5.6841e+000	6.2208e+000	0.0000e+000	7.7818e-004
8.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	7.0000e+001	1	2.8344e-063	6.5521e-069	6.9463e-058	1.6750e+001	1.5995e+001	1.7505e+001	0.0000e+000	4.6867e-004
9.0000e+000	7.5000e+001	1	3.0362e-027	1.4151e-029	5.1611e-025	1.0748e+001	1.0263e+001	1.1232e+001	0.0000e+000	3.6136e-004
9.0000e+000	8.0000e+001	1	9.0854e-159	3.4391e-173	5.5733e-145	2.6821e+001	2.5612e+001	2.8031e+001	0.0000e+000	8.8490e-004
9.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0500e+002	1	1.6757e-011	2.1168e-012	1.2153e-010	6.6302e+000	6.3313e+000	6.9292e+000	0.0000e+000	5.5233e-004
9.0000e+000	1.1000e+002	1	1.4663e-010	2.2526e-011	8.8199e-010	6.3023e+000	6.0182e+000	6.5864e+000	0.0000e+000	7.1730e-004
9.0000e+000	1.1500e+002	1	1.0195e-009	1.8650e-010	5.1898e-009	5.9947e+000	5.7244e+000	6.2649e+000	0.0000e+000	7.7501e-004
9.0000e+000	1.2000e+002	1	3.4788e-007	1.0727e-007	1.0749e-006	4.9625e+000	4.7388e+000	5.1863e+000	0.0000e+000	7.4304e-004

Tabla 1. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador DFE en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.293489e+001
5.000000e+000	7.500000e+001	1	2.267061e+001
5.000000e+000	8.000000e+001	1	2.235506e+001
5.000000e+000	8.500000e+001	1	2.195892e+001
5.000000e+000	9.000000e+001	1	2.147710e+001
5.000000e+000	9.500000e+001	1	2.090196e+001
5.000000e+000	1.000000e+002	1	2.024339e+001
5.000000e+000	1.050000e+002	1	1.950241e+001
5.000000e+000	1.100000e+002	1	1.867169e+001
5.000000e+000	1.150000e+002	1	1.776506e+001
5.000000e+000	1.200000e+002	1	1.678951e+001
6.000000e+000	7.000000e+001	1	2.293489e+001
6.000000e+000	7.500000e+001	1	2.267061e+001
6.000000e+000	8.000000e+001	1	2.235506e+001
6.000000e+000	8.500000e+001	1	2.195892e+001
6.000000e+000	9.000000e+001	1	2.147710e+001
6.000000e+000	9.500000e+001	1	2.090196e+001
6.000000e+000	1.000000e+002	1	2.024339e+001
6.000000e+000	1.050000e+002	1	1.950241e+001
6.000000e+000	1.100000e+002	1	1.867169e+001
6.000000e+000	1.150000e+002	1	1.776506e+001
6.000000e+000	1.200000e+002	1	1.678951e+001
7.000000e+000	7.000000e+001	1	2.293489e+001
7.000000e+000	7.500000e+001	1	2.267061e+001
7.000000e+000	8.000000e+001	1	2.235506e+001
7.000000e+000	8.500000e+001	1	2.195892e+001
7.000000e+000	9.000000e+001	1	2.147710e+001
7.000000e+000	9.500000e+001	1	2.090196e+001
7.000000e+000	1.000000e+002	1	2.024339e+001
7.000000e+000	1.050000e+002	1	1.950241e+001
7.000000e+000	1.100000e+002	1	1.867169e+001
7.000000e+000	1.150000e+002	1	1.776506e+001
7.000000e+000	1.200000e+002	1	1.678951e+001
8.000000e+000	7.000000e+001	1	2.293489e+001
8.000000e+000	7.500000e+001	1	2.267061e+001
8.000000e+000	8.000000e+001	1	2.235506e+001
8.000000e+000	8.500000e+001	1	2.195892e+001
8.000000e+000	9.000000e+001	1	2.147710e+001
8.000000e+000	9.500000e+001	1	2.090196e+001
8.000000e+000	1.000000e+002	1	2.024339e+001
8.000000e+000	1.050000e+002	1	1.950241e+001
8.000000e+000	1.100000e+002	1	1.867169e+001
8.000000e+000	1.150000e+002	1	1.776506e+001
8.000000e+000	1.200000e+002	1	1.678951e+001
9.000000e+000	7.000000e+001	1	2.293489e+001
9.000000e+000	7.500000e+001	1	2.267061e+001
9.000000e+000	8.000000e+001	1	2.235506e+001
9.000000e+000	8.500000e+001	1	2.195892e+001
9.000000e+000	9.000000e+001	1	2.147710e+001
9.000000e+000	9.500000e+001	1	2.090196e+001
9.000000e+000	1.000000e+002	1	2.024339e+001
9.000000e+000	1.050000e+002	1	1.950241e+001
9.000000e+000	1.100000e+002	1	1.867169e+001
9.000000e+000	1.150000e+002	1	1.776506e+001
9.000000e+000	1.200000e+002	1	1.678951e+001

Tabla 2. Medidas de OSNR. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q	Q_lo	Q_hi	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7677e-003
5.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7623e-003
5.0000e+000	8.0000e+001	1	4.9407e-324	0.0000e+000	1.1939e-295	3.8465e+001	3.6730e+001	4.0199e+001	0.0000e+000	1.7562e-003
5.0000e+000	8.5000e+001	1	6.2228e-228	1.0057e-248	4.6832e-208	3.2211e+001	3.0759e+001	3.3663e+001	0.0000e+000	1.7404e-003
5.0000e+000	9.0000e+001	1	8.2810e-141	1.4113e-153	1.3344e-128	2.5235e+001	2.4097e+001	2.6373e+001	0.0000e+000	1.6824e-003
5.0000e+000	9.5000e+001	1	5.1575e-093	2.1988e-101	5.1922e-085	2.0424e+001	1.9503e+001	2.1344e+001	0.0000e+000	1.6410e-003
5.0000e+000	1.0000e+002	1	8.7474e-059	5.2265e-064	8.6484e-054	1.6123e+001	1.5396e+001	1.6850e+001	0.0000e+000	1.6277e-003
5.0000e+000	1.0500e+002	1	7.3110e-042	1.5615e-045	2.3674e-038	1.3505e+001	1.2896e+001	1.4114e+001	0.0000e+000	1.5952e-003
5.0000e+000	1.1000e+002	1	4.2509e-028	1.6552e-030	8.5809e-026	1.0928e+001	1.0435e+001	1.1420e+001	0.0000e+000	1.5875e-003
5.0000e+000	1.1500e+002	1	1.6873e-012	1.7321e-013	1.4922e-011	6.9612e+000	6.6473e+000	7.2750e+000	0.0000e+000	1.4993e-003
5.0000e+000	1.2000e+002	1	7.2747e-012	8.5225e-013	5.6703e-011	6.7523e+000	6.4479e+000	7.0567e+000	0.0000e+000	1.4501e-003
6.0000e+000	7.0000e+001	1	4.2881e-254	2.6968e-277	6.4935e-232	3.4028e+001	3.2494e+001	3.5562e+001	0.0000e+000	1.3372e-003
6.0000e+000	7.5000e+001	1	1.2726e-067	1.1724e-073	7.5139e-062	1.7335e+001	1.6554e+001	1.8117e+001	0.0000e+000	8.3167e-004
6.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	1.7523e-003
6.0000e+000	8.5000e+001	1	1.1685e-243	6.7222e-266	2.1328e-222	3.3315e+001	3.1813e+001	3.4817e+001	0.0000e+000	1.7279e-003
6.0000e+000	9.0000e+001	1	2.8835e-171	7.7126e-187	2.2272e-156	2.7872e+001	2.6616e+001	2.9129e+001	0.0000e+000	1.6932e-003
6.0000e+000	9.5000e+001	1	3.8611e-106	1.0209e-115	5.5450e-097	2.1850e+001	2.0865e+001	2.2835e+001	0.0000e+000	1.6735e-003
6.0000e+000	1.0000e+002	1	4.2458e-018	1.3522e-019	1.1496e-016	8.5927e+000	8.2054e+000	8.9801e+000	0.0000e+000	1.0857e-003
6.0000e+000	1.0500e+002	1	2.3206e-014	1.6156e-015	2.9749e-013	7.5416e+000	7.2016e+000	7.8816e+000	0.0000e+000	9.8708e-004
6.0000e+000	1.1000e+002	1	1.1411e-031	2.0937e-034	4.7286e-029	1.1650e+001	1.1125e+001	1.2176e+001	0.0000e+000	1.5547e-003
6.0000e+000	1.1500e+002	1	8.0566e-021	1.4496e-022	3.7652e-019	9.2854e+000	8.8668e+000	9.7040e+000	0.0000e+000	1.5375e-003
6.0000e+000	1.2000e+002	1	3.0453e-014	2.1731e-015	3.8130e-013	7.5061e+000	7.1677e+000	7.8445e+000	0.0000e+000	1.4638e-003
7.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.5000e+001	1	2.5542e-090	1.9269e-098	1.4901e-082	2.0118e+001	1.9211e+001	2.1025e+001	0.0000e+000	8.9626e-004
7.0000e+000	8.0000e+001	1	1.2136e-260	1.9030e-284	6.9331e-238	3.4468e+001	3.2914e+001	3.6022e+001	0.0000e+000	1.7550e-003
7.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.5000e+001	1	9.5171e-097	1.8399e-105	2.0405e-088	2.0839e+001	1.9900e+001	2.1779e+001	0.0000e+000	1.6610e-003
7.0000e+000	1.0000e+002	1	3.7366e-023	4.1176e-025	2.7904e-021	9.8413e+000	9.3976e+000	1.0285e+001	0.0000e+000	1.1562e-003
7.0000e+000	1.0500e+002	1	1.1177e-018	3.1523e-020	3.3990e-017	8.7447e+000	8.3505e+000	9.1390e+000	0.0000e+000	1.0779e-003
7.0000e+000	1.1000e+002	1	2.1542e-016	9.8059e-018	4.1455e-015	8.1296e+000	7.7631e+000	8.4961e+000	0.0000e+000	1.4485e-003
7.0000e+000	1.1500e+002	1	6.3667e-014	4.8573e-015	7.4780e-013	7.4089e+000	7.0749e+000	7.7429e+000	0.0000e+000	1.5950e-003
7.0000e+000	1.2000e+002	1	2.0621e-013	1.7501e-014	2.1876e-012	7.2514e+000	6.9245e+000	7.5783e+000	0.0000e+000	1.5408e-003
8.0000e+000	7.0000e+001	1	1.6124e-187	1.3744e-204	3.3572e-171	2.9183e+001	2.7867e+001	3.0498e+001	0.0000e+000	1.1801e-003
8.0000e+000	7.5000e+001	1	4.1864e-077	5.1834e-084	1.6836e-070	1.8549e+001	1.7712e+001	1.9385e+001	0.0000e+000	8.3438e-004
8.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.1000e+002	1	5.9771e-017	2.4214e-018	1.2858e-015	8.2836e+000	7.9101e+000	8.6570e+000	0.0000e+000	1.4504e-003
8.0000e+000	1.1500e+002	1	9.3129e-015	5.9682e-016	1.2922e-013	7.6598e+000	7.3144e+000	8.0051e+000	0.0000e+000	1.5799e-003
8.0000e+000	1.2000e+002	1	1.0377e-009	1.9013e-010	5.2745e-009	5.9918e+000	5.7217e+000	6.2619e+000	0.0000e+000	1.5353e-003
9.0000e+000	7.0000e+001	1	2.1309e-102	1.2448e-111	1.4344e-093	2.1453e+001	2.0486e+001	2.2420e+001	0.0000e+000	9.0825e-004
9.0000e+000	7.5000e+001	1	3.0168e-042	5.9409e-046	1.0557e-038	1.3570e+001	1.2958e+001	1.4182e+001	0.0000e+000	6.8702e-004
9.0000e+000	8.0000e+001	1	1.5315e-308	0.0000e+000	1.4463e-281	3.7529e+001	3.5837e+001	3.9221e+001	0.0000e+000	1.7747e-003
9.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0500e+002	1	2.5552e-019	6.3001e-021	8.8359e-018	8.9098e+000	8.5082e+000	9.3115e+000	0.0000e+000	1.1102e-003
9.0000e+000	1.1000e+002	1	4.3457e-017	1.7102e-018	9.6110e-016	8.3214e+000	7.9463e+000	8.6966e+000	0.0000e+000	1.4379e-003
9.0000e+000	1.1500e+002	1	4.2882e-015	2.5613e-016	6.3643e-014	7.7588e+000	7.4090e+000	8.1086e+000	0.0000e+000	1.5742e-003
9.0000e+000	1.2000e+002	1	8.9934e-010	1.6267e-010	4.6277e-009	6.0150e+000	5.7438e+000	6.2862e+000	0.0000e+000	1.5223e-003

Tabla 3. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador DFE en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.335170e+001
5.000000e+000	7.500000e+001	1	2.320339e+001
5.000000e+000	8.000000e+001	1	2.302870e+001
5.000000e+000	8.500000e+001	1	2.279658e+001
5.000000e+000	9.000000e+001	1	2.250015e+001
5.000000e+000	9.500000e+001	1	2.212559e+001
5.000000e+000	1.000000e+002	1	2.168028e+001
5.000000e+000	1.050000e+002	1	2.115828e+001
5.000000e+000	1.100000e+002	1	2.053809e+001
5.000000e+000	1.150000e+002	1	1.982874e+001
5.000000e+000	1.200000e+002	1	1.902998e+001
6.000000e+000	7.000000e+001	1	2.335170e+001
6.000000e+000	7.500000e+001	1	2.320339e+001
6.000000e+000	8.000000e+001	1	2.302870e+001
6.000000e+000	8.500000e+001	1	2.279658e+001
6.000000e+000	9.000000e+001	1	2.250015e+001
6.000000e+000	9.500000e+001	1	2.212559e+001
6.000000e+000	1.000000e+002	1	2.168028e+001
6.000000e+000	1.050000e+002	1	2.115828e+001
6.000000e+000	1.100000e+002	1	2.053809e+001
6.000000e+000	1.150000e+002	1	1.982874e+001
6.000000e+000	1.200000e+002	1	1.902998e+001
7.000000e+000	7.000000e+001	1	2.335170e+001
7.000000e+000	7.500000e+001	1	2.320339e+001
7.000000e+000	8.000000e+001	1	2.302870e+001
7.000000e+000	8.500000e+001	1	2.279658e+001
7.000000e+000	9.000000e+001	1	2.250015e+001
7.000000e+000	9.500000e+001	1	2.212559e+001
7.000000e+000	1.000000e+002	1	2.168028e+001
7.000000e+000	1.050000e+002	1	2.115828e+001
7.000000e+000	1.100000e+002	1	2.053809e+001
7.000000e+000	1.150000e+002	1	1.982874e+001
7.000000e+000	1.200000e+002	1	1.902998e+001
8.000000e+000	7.000000e+001	1	2.335170e+001
8.000000e+000	7.500000e+001	1	2.320339e+001
8.000000e+000	8.000000e+001	1	2.302870e+001
8.000000e+000	8.500000e+001	1	2.279658e+001
8.000000e+000	9.000000e+001	1	2.250015e+001
8.000000e+000	9.500000e+001	1	2.212559e+001
8.000000e+000	1.000000e+002	1	2.168028e+001
8.000000e+000	1.050000e+002	1	2.115828e+001
8.000000e+000	1.100000e+002	1	2.053809e+001
8.000000e+000	1.150000e+002	1	1.982874e+001
8.000000e+000	1.200000e+002	1	1.902998e+001
9.000000e+000	7.000000e+001	1	2.335170e+001
9.000000e+000	7.500000e+001	1	2.320339e+001
9.000000e+000	8.000000e+001	1	2.302870e+001
9.000000e+000	8.500000e+001	1	2.279658e+001
9.000000e+000	9.000000e+001	1	2.250015e+001
9.000000e+000	9.500000e+001	1	2.212559e+001
9.000000e+000	1.000000e+002	1	2.168028e+001
9.000000e+000	1.050000e+002	1	2.115828e+001
9.000000e+000	1.100000e+002	1	2.053809e+001
9.000000e+000	1.150000e+002	1	1.982874e+001
9.000000e+000	1.200000e+002	1	1.902998e+001

Tabla 4. Medidas de OSNR. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q	Q_lo	Q_hi	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6535e-003
5.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6451e-003
5.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6396e-003
5.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6146e-003
5.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	9.5000e+001	1	1.7096e-114	7.6996e-125	1.3331e-104	2.2712e+001	2.1688e+001	2.3736e+001	0.0000e+000	2.4772e-003
5.0000e+000	1.0000e+002	1	8.6656e-085	2.1089e-092	1.6504e-077	1.9477e+001	1.8599e+001	2.0355e+001	0.0000e+000	2.4581e-003
5.0000e+000	1.0500e+002	1	2.6548e-060	1.1507e-065	3.5675e-055	1.6338e+001	1.5601e+001	1.7074e+001	0.0000e+000	2.4046e-003
5.0000e+000	1.1000e+002	1	2.1486e-039	7.7275e-043	4.2279e-036	1.3080e+001	1.2490e+001	1.3669e+001	0.0000e+000	2.3973e-003
5.0000e+000	1.1500e+002	1	6.2484e-017	2.5415e-018	1.3390e-015	8.2783e+000	7.9051e+000	8.6515e+000	0.0000e+000	2.2663e-003
5.0000e+000	1.2000e+002	1	8.4341e-016	4.3461e-017	1.4415e-014	7.9624e+000	7.6035e+000	8.3214e+000	0.0000e+000	2.2017e-003
6.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.0108e-003
6.0000e+000	7.5000e+001	1	1.4584e-102	8.2268e-112	1.0149e-093	2.1471e+001	2.0503e+001	2.2439e+001	0.0000e+000	1.2581e-003
6.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6321e-003
6.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.5993e-003
6.0000e+000	9.0000e+001	1	5.5764e-257	1.9014e-280	1.5160e-234	3.4223e+001	3.2680e+001	3.5765e+001	0.0000e+000	2.5459e-003
6.0000e+000	9.5000e+001	1	2.5219e-135	1.3742e-147	1.3378e-123	2.4730e+001	2.3615e+001	2.5845e+001	0.0000e+000	2.5156e-003
6.0000e+000	1.0000e+002	1	6.7950e-022	9.7571e-024	3.9397e-020	9.5452e+000	9.1148e+000	9.9755e+000	0.0000e+000	1.3355e-003
6.0000e+000	1.0500e+002	1	1.5303e-058	9.6253e-064	1.4405e-053	1.6089e+001	1.5363e+001	1.6814e+001	0.0000e+000	2.4152e-003
6.0000e+000	1.1000e+002	1	1.0856e-045	1.0329e-049	7.6146e-042	1.4139e+001	1.3502e+001	1.4777e+001	0.0000e+000	2.3514e-003
6.0000e+000	1.1500e+002	1	8.4876e-029	2.8521e-031	1.9725e-026	1.1073e+001	1.0574e+001	1.1572e+001	0.0000e+000	2.3461e-003
6.0000e+000	1.2000e+002	1	3.3291e-019	8.4086e-021	1.1250e-017	8.8805e+000	8.4801e+000	9.2808e+000	0.0000e+000	2.2197e-003
7.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.5000e+001	1	1.1553e-131	1.3677e-143	2.9190e-120	2.4388e+001	2.3288e+001	2.5487e+001	0.0000e+000	1.3483e-003
7.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6361e-003
7.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.5000e+001	1	1.5000e-123	9.9125e-135	7.3251e-113	2.3611e+001	2.2546e+001	2.4675e+001	0.0000e+000	2.5199e-003
7.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0500e+002	1	1.1395e-026	5.9937e-029	1.7256e-024	1.0625e+001	1.0146e+001	1.1104e+001	0.0000e+000	1.6205e-003
7.0000e+000	1.1000e+002	1	5.6910e-023	6.5167e-025	4.0966e-021	9.7989e+000	9.3571e+000	1.0241e+001	0.0000e+000	1.2769e-003
7.0000e+000	1.1500e+002	1	1.5154e-018	4.3939e-020	4.4878e-017	8.7103e+000	8.3176e+000	9.1030e+000	0.0000e+000	2.4089e-003
7.0000e+000	1.2000e+002	1	1.4006e-017	4.9722e-019	3.4181e-016	8.4546e+000	8.0734e+000	8.8357e+000	0.0000e+000	2.3421e-003
8.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	7.5000e+001	1	1.0253e-105	2.9658e-115	1.3513e-096	2.1806e+001	2.0823e+001	2.2789e+001	0.0000e+000	1.2505e-003
8.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.1000e+002	1	1.0667e-023	1.0484e-025	8.8870e-022	9.9666e+000	9.5173e+000	1.0416e+001	0.0000e+000	2.1836e-003
8.0000e+000	1.1500e+002	1	6.7066e-020	1.4638e-021	2.6057e-018	9.0570e+000	8.6486e+000	9.4653e+000	0.0000e+000	2.3833e-003
8.0000e+000	1.2000e+002	1	3.4152e-012	3.7367e-013	2.8417e-011	6.8612e+000	6.5518e+000	7.1705e+000	0.0000e+000	2.3295e-003
9.0000e+000	7.0000e+001	1	3.3758e-141	5.2973e-154	5.8869e-129	2.5270e+001	2.4131e+001	2.6410e+001	0.0000e+000	1.3454e-003
9.0000e+000	7.5000e+001	1	5.1528e-087	7.8272e-095	1.5399e-079	1.9737e+001	1.8848e+001	2.0627e+001	0.0000e+000	1.0098e-003
9.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6627e-003
9.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0500e+002	1	1.6682e-027	7.3610e-030	2.9881e-025	1.0803e+001	1.0316e+001	1.1290e+001	0.0000e+000	1.6805e-003
9.0000e+000	1.1000e+002	1	8.3847e-024	8.0611e-026	7.1337e-022	9.9905e+000	9.5401e+000	1.0441e+001	0.0000e+000	2.1646e-003
9.0000e+000	1.1500e+002	1	1.7874e-020	3.4583e-022	7.7928e-019	9.2001e+000	8.7854e+000	9.6149e+000	0.0000e+000	2.3758e-003
9.0000e+000	1.2000e+002	1	5.9432e-019	1.5825e-020	1.9095e-017	8.8158e+000	8.4183e+000	9.2132e+000	0.0000e+000	2.3096e-003

Tabla 5. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador DFE en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.349873e+001
5.000000e+000	7.500000e+001	1	2.339534e+001
5.000000e+000	8.000000e+001	1	2.327724e+001
5.000000e+000	8.500000e+001	1	2.311456e+001
5.000000e+000	9.000000e+001	1	2.290155e+001
5.000000e+000	9.500000e+001	1	2.262306e+001
5.000000e+000	1.000000e+002	1	2.228752e+001
5.000000e+000	1.050000e+002	1	2.188729e+001
5.000000e+000	1.100000e+002	1	2.139350e+001
5.000000e+000	1.150000e+002	1	2.081202e+001
5.000000e+000	1.200000e+002	1	2.013649e+001
6.000000e+000	7.000000e+001	1	2.349873e+001
6.000000e+000	7.500000e+001	1	2.339534e+001
6.000000e+000	8.000000e+001	1	2.327724e+001
6.000000e+000	8.500000e+001	1	2.311456e+001
6.000000e+000	9.000000e+001	1	2.290155e+001
6.000000e+000	9.500000e+001	1	2.262306e+001
6.000000e+000	1.000000e+002	1	2.228752e+001
6.000000e+000	1.050000e+002	1	2.188729e+001
6.000000e+000	1.100000e+002	1	2.139350e+001
6.000000e+000	1.150000e+002	1	2.081202e+001
6.000000e+000	1.200000e+002	1	2.013649e+001
7.000000e+000	7.000000e+001	1	2.349873e+001
7.000000e+000	7.500000e+001	1	2.339534e+001
7.000000e+000	8.000000e+001	1	2.327724e+001
7.000000e+000	8.500000e+001	1	2.311456e+001
7.000000e+000	9.000000e+001	1	2.290155e+001
7.000000e+000	9.500000e+001	1	2.262306e+001
7.000000e+000	1.000000e+002	1	2.228752e+001
7.000000e+000	1.050000e+002	1	2.188729e+001
7.000000e+000	1.100000e+002	1	2.139350e+001
7.000000e+000	1.150000e+002	1	2.081202e+001
7.000000e+000	1.200000e+002	1	2.013649e+001
8.000000e+000	7.000000e+001	1	2.349873e+001
8.000000e+000	7.500000e+001	1	2.339534e+001
8.000000e+000	8.000000e+001	1	2.327724e+001
8.000000e+000	8.500000e+001	1	2.311456e+001
8.000000e+000	9.000000e+001	1	2.290155e+001
8.000000e+000	9.500000e+001	1	2.262306e+001
8.000000e+000	1.000000e+002	1	2.228752e+001
8.000000e+000	1.050000e+002	1	2.188729e+001
8.000000e+000	1.100000e+002	1	2.139350e+001
8.000000e+000	1.150000e+002	1	2.081202e+001
8.000000e+000	1.200000e+002	1	2.013649e+001
9.000000e+000	7.000000e+001	1	2.349873e+001
9.000000e+000	7.500000e+001	1	2.339534e+001
9.000000e+000	8.000000e+001	1	2.327724e+001
9.000000e+000	8.500000e+001	1	2.311456e+001
9.000000e+000	9.000000e+001	1	2.290155e+001
9.000000e+000	9.500000e+001	1	2.262306e+001
9.000000e+000	1.000000e+002	1	2.228752e+001
9.000000e+000	1.050000e+002	1	2.188729e+001
9.000000e+000	1.100000e+002	1	2.139350e+001
9.000000e+000	1.150000e+002	1	2.081202e+001
9.000000e+000	1.200000e+002	1	2.013649e+001

Tabla 6. Medidas de OSNR. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q	Q_lo	Q_hi	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5405e-003
5.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5268e-003
5.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5245e-003
5.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4882e-003
5.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	9.5000e+001	1	1.5351e-151	2.6897e-165	2.1767e-138	2.6194e+001	2.5014e+001	2.7375e+001	0.0000e+000	3.3181e-003
5.0000e+000	1.0000e+002	1	3.4235e-113	2.0315e-123	2.0509e-103	2.2580e+001	2.1562e+001	2.3598e+001	0.0000e+000	3.2906e-003
5.0000e+000	1.0500e+002	1	3.6282e-079	2.9032e-086	2.2147e-072	1.8802e+001	1.7954e+001	1.9650e+001	0.0000e+000	3.2184e-003
5.0000e+000	1.1000e+002	1	5.8342e-051	1.8229e-055	1.1865e-046	1.4969e+001	1.4294e+001	1.5644e+001	0.0000e+000	3.2141e-003
5.0000e+000	1.1500e+002	1	9.6454e-022	1.4300e-023	5.4241e-020	9.5088e+000	9.0801e+000	9.9375e+000	0.0000e+000	3.0398e-003
5.0000e+000	1.2000e+002	1	7.1221e-020	1.5631e-021	2.7527e-018	9.0504e+000	8.6424e+000	9.4584e+000	0.0000e+000	2.9568e-003
6.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	2.6880e-003
6.0000e+000	7.5000e+001	1	7.9913e-139	2.0742e-151	8.6139e-127	2.5054e+001	2.3924e+001	2.6183e+001	0.0000e+000	1.6917e-003
6.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5127e-003
6.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4973e-003
6.0000e+000	9.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.4009e-003
6.0000e+000	9.5000e+001	1	1.8319e-179	8.6174e-196	7.4523e-164	2.8541e+001	2.7254e+001	2.9827e+001	0.0000e+000	3.3677e-003
6.0000e+000	1.0000e+002	1	4.4414e-029	1.4066e-031	1.0923e-026	1.1131e+001	1.0629e+001	1.1633e+001	0.0000e+000	1.7985e-003
6.0000e+000	1.0500e+002	1	7.3175e-077	9.5375e-084	2.8018e-070	1.8519e+001	1.7684e+001	1.9353e+001	0.0000e+000	3.2334e-003
6.0000e+000	1.1000e+002	1	1.7112e-054	2.5336e-059	7.1058e-050	1.5501e+001	1.4802e+001	1.6200e+001	0.0000e+000	3.2001e-003
6.0000e+000	1.1500e+002	1	1.0701e-036	6.8003e-040	1.2220e-033	1.2599e+001	1.2031e+001	1.3167e+001	0.0000e+000	3.1543e-003
6.0000e+000	1.2000e+002	1	3.3280e-024	2.9406e-026	3.0693e-022	1.0082e+001	9.6272e+000	1.0536e+001	0.0000e+000	2.9821e-003
7.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.5000e+001	1	5.0377e-172	1.1475e-187	4.5370e-157	2.7935e+001	2.6675e+001	2.9194e+001	0.0000e+000	1.8024e-003
7.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5182e-003
7.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.5000e+001	1	4.9998e-159	1.7913e-173	3.2326e-145	2.6844e+001	2.5633e+001	2.8054e+001	0.0000e+000	3.3647e-003
7.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	1.0500e+002	1	7.4024e-020	1.6303e-021	2.8514e-018	9.0462e+000	8.6384e+000	9.4540e+000	0.0000e+000	1.7011e-003
7.0000e+000	1.1000e+002	1	4.8187e-030	1.2455e-032	1.4392e-027	1.1327e+001	1.0816e+001	1.1838e+001	0.0000e+000	2.9105e-003
7.0000e+000	1.1500e+002	1	2.2760e-023	2.3971e-025	1.7748e-021	9.8911e+000	9.4451e+000	1.0337e+001	0.0000e+000	3.2247e-003
7.0000e+000	1.2000e+002	1	7.1870e-022	1.0373e-023	4.1467e-020	9.5393e+000	9.1093e+000	9.9694e+000	0.0000e+000	3.1445e-003
8.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	7.5000e+001	1	6.3666e-135	3.7780e-147	3.1132e-123	2.4693e+001	2.3580e+001	2.5806e+001	0.0000e+000	1.6693e-003
8.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	1.1000e+002	1	7.6174e-031	1.6630e-033	2.6735e-028	1.1488e+001	1.0970e+001	1.2005e+001	0.0000e+000	2.9223e-003
8.0000e+000	1.1500e+002	1	3.7120e-025	2.6844e-027	4.1462e-023	1.0295e+001	9.8308e+000	1.0759e+001	0.0000e+000	3.1885e-003
8.0000e+000	1.2000e+002	1	4.3952e-023	4.9156e-025	3.2360e-021	9.8250e+000	9.3820e+000	1.0268e+001	0.0000e+000	3.1290e-003
9.0000e+000	7.0000e+001	1	1.0544e-118	1.9461e-129	1.9290e-108	2.3134e+001	2.2091e+001	2.4177e+001	0.0000e+000	1.3484e-003
9.0000e+000	7.5000e+001	1	3.1120e-110	3.4563e-120	1.0239e-100	2.2277e+001	2.1272e+001	2.3281e+001	0.0000e+000	1.3346e-003
9.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	1.4142e+003	1.3505e+003	1.4780e+003	0.0000e+000	3.5174e-003
9.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.0500e+002	1	3.2681e-036	2.3005e-039	3.3843e-033	1.2511e+001	1.1947e+001	1.3075e+001	0.0000e+000	2.2583e-003
9.0000e+000	1.1000e+002	1	1.0762e-030	2.4251e-033	3.6649e-028	1.1458e+001	1.0941e+001	1.1974e+001	0.0000e+000	2.8971e-003
9.0000e+000	1.1500e+002	1	7.7279e-026	4.8419e-028	9.9000e-024	1.0445e+001	9.9740e+000	1.0916e+001	0.0000e+000	3.1794e-003
9.0000e+000	1.2000e+002	1	9.7025e-024	9.4532e-026	8.1503e-022	9.9760e+000	9.5263e+000	1.0426e+001	0.0000e+000	3.1024e-003

Tabla 7. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador DFE en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Numero_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.357308e+001
5.000000e+000	7.500000e+001	1	2.349356e+001
5.000000e+000	8.000000e+001	1	2.340589e+001
5.000000e+000	8.500000e+001	1	2.328153e+001
5.000000e+000	9.000000e+001	1	2.311603e+001
5.000000e+000	9.500000e+001	1	2.289388e+001
5.000000e+000	1.000000e+002	1	2.262527e+001
5.000000e+000	1.050000e+002	1	2.230263e+001
5.000000e+000	1.100000e+002	1	2.189313e+001
5.000000e+000	1.150000e+002	1	2.140131e+001
5.000000e+000	1.200000e+002	1	2.081663e+001
6.000000e+000	7.000000e+001	1	2.357308e+001
6.000000e+000	7.500000e+001	1	2.349356e+001
6.000000e+000	8.000000e+001	1	2.340589e+001
6.000000e+000	8.500000e+001	1	2.328153e+001
6.000000e+000	9.000000e+001	1	2.311603e+001
6.000000e+000	9.500000e+001	1	2.289388e+001
6.000000e+000	1.000000e+002	1	2.262527e+001
6.000000e+000	1.050000e+002	1	2.230263e+001
6.000000e+000	1.100000e+002	1	2.189313e+001
6.000000e+000	1.150000e+002	1	2.140131e+001
6.000000e+000	1.200000e+002	1	2.081663e+001
7.000000e+000	7.000000e+001	1	2.357308e+001
7.000000e+000	7.500000e+001	1	2.349356e+001
7.000000e+000	8.000000e+001	1	2.340589e+001
7.000000e+000	8.500000e+001	1	2.328153e+001
7.000000e+000	9.000000e+001	1	2.311603e+001
7.000000e+000	9.500000e+001	1	2.289388e+001
7.000000e+000	1.000000e+002	1	2.262527e+001
7.000000e+000	1.050000e+002	1	2.230263e+001
7.000000e+000	1.100000e+002	1	2.189313e+001
7.000000e+000	1.150000e+002	1	2.140131e+001
7.000000e+000	1.200000e+002	1	2.081663e+001
8.000000e+000	7.000000e+001	1	2.357308e+001
8.000000e+000	7.500000e+001	1	2.349356e+001
8.000000e+000	8.000000e+001	1	2.340589e+001
8.000000e+000	8.500000e+001	1	2.328153e+001
8.000000e+000	9.000000e+001	1	2.311603e+001
8.000000e+000	9.500000e+001	1	2.289388e+001
8.000000e+000	1.000000e+002	1	2.262527e+001
8.000000e+000	1.050000e+002	1	2.230263e+001
8.000000e+000	1.100000e+002	1	2.189313e+001
8.000000e+000	1.150000e+002	1	2.140131e+001
8.000000e+000	1.200000e+002	1	2.081663e+001
9.000000e+000	7.000000e+001	1	2.357308e+001
9.000000e+000	7.500000e+001	1	2.349356e+001
9.000000e+000	8.000000e+001	1	2.340589e+001
9.000000e+000	8.500000e+001	1	2.328153e+001
9.000000e+000	9.000000e+001	1	2.311603e+001
9.000000e+000	9.500000e+001	1	2.289388e+001
9.000000e+000	1.000000e+002	1	2.262527e+001
9.000000e+000	1.050000e+002	1	2.230263e+001
9.000000e+000	1.100000e+002	1	2.189313e+001
9.000000e+000	1.150000e+002	1	2.140131e+001
9.000000e+000	1.200000e+002	1	2.081663e+001

Tabla 8. Medidas de OSNR. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Anexo U: Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato de modulación NRZ-OOK.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q ² (dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	7.5000e+001	1	3.7289e-041	9.2479e-045	1.0468e-037	2.2532e+001	0.0000e+000	3.5254e-004
5.0000e+000	8.0000e+001	1	8.5467e-169	3.8609e-184	4.0000e-154	2.8839e+001	0.0000e+000	8.7746e-004
5.0000e+000	8.5000e+001	1	1.6171e-119	2.5117e-130	3.4889e-109	2.7315e+001	0.0000e+000	8.6989e-004
5.0000e+000	9.0000e+001	1	2.7591e-081	1.4097e-088	2.5860e-074	2.5602e+001	0.0000e+000	8.5656e-004
5.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.0500e+002	1	8.2654e-029	2.7707e-031	1.9253e-026	2.0887e+001	0.0000e+000	8.2132e-004
5.0000e+000	1.1000e+002	1	1.8786e-019	4.5038e-021	6.6725e-018	1.9031e+001	0.0000e+000	8.1904e-004
5.0000e+000	1.1500e+002	1	1.0427e-008	2.3503e-009	4.3475e-008	1.4971e+001	0.0000e+000	8.1344e-004
5.0000e+000	1.2000e+002	1	4.4409e-008	1.1396e-008	1.6356e-007	1.4564e+001	0.0000e+000	7.8153e-004
6.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	7.5000e+001	1	1.4107e-096	2.8278e-105	2.9218e-088	2.6370e+001	0.0000e+000	7.3897e-004
6.0000e+000	8.0000e+001	1	4.3678e-166	3.5039e-181	1.1807e-151	2.8768e+001	0.0000e+000	8.7874e-004
6.0000e+000	8.5000e+001	1	2.1007e-118	4.1311e-129	3.6169e-108	2.7274e+001	0.0000e+000	8.7207e-004
6.0000e+000	9.0000e+001	1	5.4198e-087	8.2710e-095	1.6125e-079	2.5905e+001	0.0000e+000	8.6160e-004
6.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.0000e+002	1	1.0251e-037	5.2542e-041	1.4376e-034	2.2132e+001	0.0000e+000	8.5187e-004
6.0000e+000	1.0500e+002	1	6.0110e-024	5.6061e-026	5.2649e-022	2.0020e+001	0.0000e+000	8.3042e-004
6.0000e+000	1.1000e+002	1	9.3794e-020	2.1108e-021	3.5393e-018	1.9104e+001	0.0000e+000	8.1662e-004
6.0000e+000	1.1500e+002	1	3.2182e-004	1.8098e-004	5.5967e-004	1.0662e+001	0.0000e+000	4.1997e-004
6.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	8.6418e-004
7.0000e+000	7.5000e+001	1	3.6686e-203	1.1337e-221	1.8203e-185	2.9655e+001	0.0000e+000	8.7496e-004
7.0000e+000	8.0000e+001	1	1.3070e-160	3.3478e-175	1.1646e-146	2.8620e+001	0.0000e+000	8.7206e-004
7.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.5000e+001	1	2.2406e-050	7.9211e-055	4.0491e-046	2.3452e+001	0.0000e+000	8.6998e-004
7.0000e+000	1.0000e+002	1	1.6268e-036	1.0742e-039	1.7907e-033	2.1984e+001	0.0000e+000	8.6590e-004
7.0000e+000	1.0500e+002	1	2.6903e-024	2.3314e-026	2.5277e-022	2.0089e+001	0.0000e+000	8.3079e-004
7.0000e+000	1.1000e+002	1	1.9168e-019	4.6040e-021	6.7965e-018	1.9028e+001	0.0000e+000	8.3331e-004
7.0000e+000	1.1500e+002	1	2.0741e-013	1.7611e-014	2.1992e-012	1.7208e+001	0.0000e+000	8.1879e-004
7.0000e+000	1.2000e+002	1	3.7046e-004	2.1088e-004	6.3680e-004	1.0563e+001	0.0000e+000	3.3191e-004
8.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	8.6470e-004
8.0000e+000	7.5000e+001	1	3.6938e-200	2.1579e-218	9.9707e-183	2.9589e+001	0.0000e+000	8.7548e-004
8.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.0000e+001	1	5.3725e-084	1.5463e-091	8.7157e-077	2.5748e+001	0.0000e+000	8.7307e-004
8.0000e+000	9.5000e+001	1	4.7541e-062	1.4239e-067	9.0952e-057	2.4392e+001	0.0000e+000	8.5485e-004
8.0000e+000	1.0000e+002	1	1.4231e-035	1.1463e-038	1.2955e-032	2.1864e+001	0.0000e+000	8.7502e-004
8.0000e+000	1.0500e+002	1	4.1307e-024	3.7227e-026	3.7385e-022	2.0052e+001	0.0000e+000	8.4678e-004
8.0000e+000	1.1000e+002	1	2.7885e-019	6.9302e-021	9.5695e-018	1.8988e+001	0.0000e+000	8.2970e-004
8.0000e+000	1.1500e+002	1	9.1468e-014	7.2112e-015	1.0411e-012	1.7338e+001	0.0000e+000	8.0456e-004
8.0000e+000	1.2000e+002	1	2.6897e-004	1.4893e-004	4.7475e-004	1.0784e+001	0.0000e+000	3.5629e-004
9.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	8.6439e-004
9.0000e+000	7.5000e+001	1	1.0103e-199	6.4750e-218	2.4959e-182	2.9580e+001	0.0000e+000	8.7496e-004
9.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.0000e+001	1	4.4498e-083	1.5556e-090	5.9946e-076	2.5699e+001	0.0000e+000	8.6754e-004
9.0000e+000	9.5000e+001	1	9.1639e-061	3.6021e-066	1.3520e-055	2.4298e+001	0.0000e+000	8.5365e-004
9.0000e+000	1.0000e+002	1	1.1943e-035	9.4666e-039	1.1040e-032	2.1873e+001	0.0000e+000	8.7574e-004
9.0000e+000	1.0500e+002	1	5.9322e-024	5.5259e-026	5.2019e-022	2.0021e+001	0.0000e+000	8.4431e-004
9.0000e+000	1.1000e+002	1	2.3207e-019	5.6719e-021	8.0925e-018	1.9008e+001	0.0000e+000	8.3285e-004
9.0000e+000	1.1500e+002	1	8.7687e-014	6.8868e-015	1.0017e-012	1.7345e+001	0.0000e+000	8.0523e-004
9.0000e+000	1.2000e+002	1	1.6847e-004	8.9575e-005	3.0913e-004	1.1090e+001	0.0000e+000	5.7207e-004

Tabla 1. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.293489e+001
5.000000e+000	7.500000e+001	1	2.267061e+001
5.000000e+000	8.000000e+001	1	2.235506e+001
5.000000e+000	8.500000e+001	1	2.195892e+001
5.000000e+000	9.000000e+001	1	2.147710e+001
5.000000e+000	9.500000e+001	1	2.090196e+001
5.000000e+000	1.000000e+002	1	2.024339e+001
5.000000e+000	1.050000e+002	1	1.950241e+001
5.000000e+000	1.100000e+002	1	1.867169e+001
5.000000e+000	1.150000e+002	1	1.776506e+001
5.000000e+000	1.200000e+002	1	1.678951e+001
6.000000e+000	7.000000e+001	1	2.293489e+001
6.000000e+000	7.500000e+001	1	2.267061e+001
6.000000e+000	8.000000e+001	1	2.235506e+001
6.000000e+000	8.500000e+001	1	2.195892e+001
6.000000e+000	9.000000e+001	1	2.147710e+001
6.000000e+000	9.500000e+001	1	2.090196e+001
6.000000e+000	1.000000e+002	1	2.024339e+001
6.000000e+000	1.050000e+002	1	1.950241e+001
6.000000e+000	1.100000e+002	1	1.867169e+001
6.000000e+000	1.150000e+002	1	1.776506e+001
6.000000e+000	1.200000e+002	1	1.678951e+001
7.000000e+000	7.000000e+001	1	2.293489e+001
7.000000e+000	7.500000e+001	1	2.267061e+001
7.000000e+000	8.000000e+001	1	2.235506e+001
7.000000e+000	8.500000e+001	1	2.195892e+001
7.000000e+000	9.000000e+001	1	2.147710e+001
7.000000e+000	9.500000e+001	1	2.090196e+001
7.000000e+000	1.000000e+002	1	2.024339e+001
7.000000e+000	1.050000e+002	1	1.950241e+001
7.000000e+000	1.100000e+002	1	1.867169e+001
7.000000e+000	1.150000e+002	1	1.776506e+001
7.000000e+000	1.200000e+002	1	1.678951e+001
8.000000e+000	7.000000e+001	1	2.293489e+001
8.000000e+000	7.500000e+001	1	2.267061e+001
8.000000e+000	8.000000e+001	1	2.235506e+001
8.000000e+000	8.500000e+001	1	2.195892e+001
8.000000e+000	9.000000e+001	1	2.147710e+001
8.000000e+000	9.500000e+001	1	2.090196e+001
8.000000e+000	1.000000e+002	1	2.024339e+001
8.000000e+000	1.050000e+002	1	1.950241e+001
8.000000e+000	1.100000e+002	1	1.867169e+001
8.000000e+000	1.150000e+002	1	1.776506e+001
8.000000e+000	1.200000e+002	1	1.678951e+001
9.000000e+000	7.000000e+001	1	2.293489e+001
9.000000e+000	7.500000e+001	1	2.267061e+001
9.000000e+000	8.000000e+001	1	2.235506e+001
9.000000e+000	8.500000e+001	1	2.195892e+001
9.000000e+000	9.000000e+001	1	2.147710e+001
9.000000e+000	9.500000e+001	1	2.090196e+001
9.000000e+000	1.000000e+002	1	2.024339e+001
9.000000e+000	1.050000e+002	1	1.950241e+001
9.000000e+000	1.100000e+002	1	1.867169e+001
9.000000e+000	1.150000e+002	1	1.776506e+001
9.000000e+000	1.200000e+002	1	1.678951e+001

Tabla 2. Medidas de OSNR. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	7.5000e+001	1	8.4978e-080	5.9502e-087	5.8931e-073	2.5520e+001	0.0000e+000	7.1220e-004
5.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	1.7530e-003
5.0000e+000	8.5000e+001	1	5.2284e-233	2.8795e-254	1.1011e-212	3.0257e+001	0.0000e+000	1.7515e-003
5.0000e+000	9.0000e+001	1	4.6707e-137	1.7630e-149	3.5196e-125	2.7921e+001	0.0000e+000	1.7282e-003
5.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.1000e+002	1	2.5586e-031	5.0549e-034	9.8794e-029	2.1275e+001	0.0000e+000	1.6761e-003
5.0000e+000	1.1500e+002	1	7.8248e-013	7.4929e-014	7.3958e-012	1.6987e+001	0.0000e+000	1.6938e-003
5.0000e+000	1.2000e+002	1	1.4146e-007	4.0260e-008	4.7192e-007	1.4210e+001	0.0000e+000	1.4130e-003
6.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	7.5000e+001	1	2.3228e-163	3.3211e-178	3.6139e-149	2.8695e+001	0.0000e+000	1.4664e-003
6.0000e+000	8.0000e+001	1	2.3359e-320	0.0000e+000	2.4228e-292	3.1652e+001	0.0000e+000	1.7569e-003
6.0000e+000	8.5000e+001	1	2.3553e-214	6.7790e-234	1.1300e-195	2.9890e+001	0.0000e+000	1.7500e-003
6.0000e+000	9.0000e+001	1	1.1148e-166	7.8864e-182	3.3984e-152	2.8784e+001	0.0000e+000	1.7302e-003
6.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.0500e+002	1	8.2493e-042	1.7815e-045	2.6431e-038	2.2604e+001	0.0000e+000	1.6989e-003
6.0000e+000	1.1000e+002	1	6.3865e-035	5.9029e-038	5.0976e-032	2.1778e+001	0.0000e+000	1.6764e-003
6.0000e+000	1.1500e+002	1	5.2762e-005	2.5354e-005	1.0665e-004	1.1771e+001	0.0000e+000	8.0855e-004
6.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	1.7470e-003
7.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	1.7527e-003
7.0000e+000	8.0000e+001	1	7.4046e-320	0.0000e+000	6.9382e-292	3.1645e+001	0.0000e+000	1.7461e-003
7.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.5000e+001	1	3.1978e-084	8.7748e-092	5.4297e-077	2.5760e+001	0.0000e+000	1.7329e-003
7.0000e+000	1.0000e+002	1	1.9903e-066	2.3609e-072	9.2300e-061	2.4699e+001	0.0000e+000	1.7527e-003
7.0000e+000	1.0500e+002	1	2.3977e-040	7.0527e-044	5.7177e-037	2.2441e+001	0.0000e+000	1.7344e-003
7.0000e+000	1.1000e+002	1	1.3723e-034	1.3604e-037	1.0244e-031	2.1734e+001	0.0000e+000	1.6950e-003
7.0000e+000	1.1500e+002	1	1.3423e-020	2.5302e-022	6.0001e-019	1.9305e+001	0.0000e+000	1.7270e-003
7.0000e+000	1.2000e+002	1	1.0504e-004	5.3601e-005	2.0046e-004	1.1379e+001	0.0000e+000	5.8825e-004
8.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	1.7488e-003
8.0000e+000	7.5000e+001	1	2.7621e-319	0.0000e+000	2.3048e-291	3.1637e+001	0.0000e+000	1.7547e-003
8.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.0000e+001	1	6.5722e-160	1.9534e-174	5.0800e-146	2.8601e+001	0.0000e+000	1.7555e-003
8.0000e+000	9.5000e+001	1	8.2040e-091	5.5754e-099	5.2890e-083	2.6096e+001	0.0000e+000	1.7555e-003
8.0000e+000	1.0000e+002	1	9.5655e-066	1.3107e-071	3.8646e-060	2.4652e+001	0.0000e+000	1.7706e-003
8.0000e+000	1.0500e+002	1	2.7198e-044	3.4776e-048	1.4383e-040	2.2867e+001	0.0000e+000	1.7114e-003
8.0000e+000	1.1000e+002	1	3.2015e-034	3.4299e-037	2.2190e-031	2.1685e+001	0.0000e+000	1.6863e-003
8.0000e+000	1.1500e+002	1	2.4076e-020	4.7864e-022	1.0228e-018	1.9246e+001	0.0000e+000	1.7245e-003
8.0000e+000	1.2000e+002	1	7.2553e-005	3.5849e-005	1.4281e-004	1.1594e+001	0.0000e+000	6.1768e-004
9.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	1.7472e-003
9.0000e+000	7.5000e+001	1	1.1152e-319	0.0000e+000	1.0079e-291	3.1643e+001	0.0000e+000	1.7532e-003
9.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.0000e+001	1	1.8436e-158	7.4483e-173	1.0626e-144	2.8561e+001	0.0000e+000	1.7449e-003
9.0000e+000	9.5000e+001	1	4.6648e-092	2.4353e-100	3.8695e-084	2.6157e+001	0.0000e+000	1.7546e-003
9.0000e+000	1.0000e+002	1	1.1413e-065	1.5895e-071	4.5400e-060	2.4647e+001	0.0000e+000	1.7747e-003
9.0000e+000	1.0500e+002	1	8.9490e-044	1.2763e-047	4.2631e-040	2.2814e+001	0.0000e+000	1.7065e-003
9.0000e+000	1.1000e+002	1	4.1020e-034	4.4956e-037	2.7821e-031	2.1671e+001	0.0000e+000	1.6971e-003
9.0000e+000	1.1500e+002	1	2.1130e-020	4.1511e-022	9.0788e-019	1.9259e+001	0.0000e+000	1.7244e-003
9.0000e+000	1.2000e+002	1	1.2047e-014	7.9031e-016	1.6347e-013	1.7647e+001	0.0000e+000	1.6800e-003
9.0000e+000	1.2000e+002	1	1.6847e-004	8.9575e-005	3.0913e-004	1.1090e+001	0.0000e+000	5.7207e-004

Tabla 3. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.335170e+001
5.000000e+000	7.500000e+001	1	2.320339e+001
5.000000e+000	8.000000e+001	1	2.302870e+001
5.000000e+000	8.500000e+001	1	2.279658e+001
5.000000e+000	9.000000e+001	1	2.250015e+001
5.000000e+000	9.500000e+001	1	2.212559e+001
5.000000e+000	1.000000e+002	1	2.168028e+001
5.000000e+000	1.050000e+002	1	2.115828e+001
5.000000e+000	1.100000e+002	1	2.053809e+001
5.000000e+000	1.150000e+002	1	1.982874e+001
5.000000e+000	1.200000e+002	1	1.902998e+001
6.000000e+000	7.000000e+001	1	2.335170e+001
6.000000e+000	7.500000e+001	1	2.320339e+001
6.000000e+000	8.000000e+001	1	2.302870e+001
6.000000e+000	8.500000e+001	1	2.279658e+001
6.000000e+000	9.000000e+001	1	2.250015e+001
6.000000e+000	9.500000e+001	1	2.212559e+001
6.000000e+000	1.000000e+002	1	2.168028e+001
6.000000e+000	1.050000e+002	1	2.115828e+001
6.000000e+000	1.100000e+002	1	2.053809e+001
6.000000e+000	1.150000e+002	1	1.982874e+001
6.000000e+000	1.200000e+002	1	1.902998e+001
7.000000e+000	7.000000e+001	1	2.335170e+001
7.000000e+000	7.500000e+001	1	2.320339e+001
7.000000e+000	8.000000e+001	1	2.302870e+001
7.000000e+000	8.500000e+001	1	2.279658e+001
7.000000e+000	9.000000e+001	1	2.250015e+001
7.000000e+000	9.500000e+001	1	2.212559e+001
7.000000e+000	1.000000e+002	1	2.168028e+001
7.000000e+000	1.050000e+002	1	2.115828e+001
7.000000e+000	1.100000e+002	1	2.053809e+001
7.000000e+000	1.150000e+002	1	1.982874e+001
7.000000e+000	1.200000e+002	1	1.902998e+001
8.000000e+000	7.000000e+001	1	2.335170e+001
8.000000e+000	7.500000e+001	1	2.320339e+001
8.000000e+000	8.000000e+001	1	2.302870e+001
8.000000e+000	8.500000e+001	1	2.279658e+001
8.000000e+000	9.000000e+001	1	2.250015e+001
8.000000e+000	9.500000e+001	1	2.212559e+001
8.000000e+000	1.000000e+002	1	2.168028e+001
8.000000e+000	1.050000e+002	1	2.115828e+001
8.000000e+000	1.100000e+002	1	2.053809e+001
8.000000e+000	1.150000e+002	1	1.982874e+001
8.000000e+000	1.200000e+002	1	1.902998e+001
9.000000e+000	7.000000e+001	1	2.335170e+001
9.000000e+000	7.500000e+001	1	2.320339e+001
9.000000e+000	8.000000e+001	1	2.302870e+001
9.000000e+000	8.500000e+001	1	2.279658e+001
9.000000e+000	9.000000e+001	1	2.250015e+001
9.000000e+000	9.500000e+001	1	2.212559e+001
9.000000e+000	1.000000e+002	1	2.168028e+001
9.000000e+000	1.050000e+002	1	2.115828e+001
9.000000e+000	1.100000e+002	1	2.053809e+001
9.000000e+000	1.150000e+002	1	1.982874e+001
9.000000e+000	1.200000e+002	1	1.902998e+001

Tabla 4. Medidas de OSNR. Configuración 5 mono canal, con equalizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hgght(V)	Eye Hgght(V)
5.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	7.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6267e-003
5.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.1000e+002	1	4.3669e-042	8.8965e-046	1.4794e-038	2.2634e+001	0.0000e+000	2.5859e-003
5.0000e+000	1.1500e+002	1	3.8663e-017	1.5054e-018	8.6383e-016	1.8418e+001	0.0000e+000	2.5793e-003
5.0000e+000	1.2000e+002	1	2.0242e-009	3.9383e-010	9.7142e-009	1.5391e+001	0.0000e+000	2.0925e-003
6.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	7.5000e+001	1	7.1083e-231	6.1550e-252	9.7136e-211	3.0216e+001	0.0000e+000	2.1924e-003
6.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6324e-003
6.0000e+000	8.5000e+001	1	6.3885e-318	0.0000e+000	4.0424e-290	3.1619e+001	0.0000e+000	2.6276e-003
6.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.0500e+002	1	2.4162e-055	2.9888e-060	1.1914e-050	2.3877e+001	0.0000e+000	2.5559e-003
6.0000e+000	1.1000e+002	1	2.2054e-047	1.4676e-051	2.1772e-043	2.3174e+001	0.0000e+000	2.5770e-003
6.0000e+000	1.1500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6235e-003
7.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6318e-003
7.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6176e-003
7.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.5000e+001	1	4.6512e-118	9.8409e-129	7.4674e-108	2.7261e+001	0.0000e+000	2.6037e-003
7.0000e+000	1.0000e+002	1	8.5570e-096	2.0246e-104	1.5125e-087	2.6334e+001	0.0000e+000	2.6405e-003
7.0000e+000	1.0500e+002	1	4.5515e-060	2.0729e-065	5.8336e-055	2.4246e+001	0.0000e+000	2.5908e-003
7.0000e+000	1.1000e+002	1	2.9181e-050	1.0569e-054	5.1527e-046	2.3441e+001	0.0000e+000	2.5574e-003
7.0000e+000	1.1500e+002	1	1.8210e-023	1.8792e-025	1.4479e-021	1.9924e+001	0.0000e+000	2.6346e-003
7.0000e+000	1.2000e+002	1	2.6639e-005	1.2057e-005	5.7021e-005	1.2129e+001	0.0000e+000	8.5686e-004
8.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6264e-003
8.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6358e-003
8.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.0000e+001	1	4.1057e-245	1.7350e-267	1.0063e-223	3.0479e+001	0.0000e+000	2.6382e-003
8.0000e+000	9.5000e+001	1	3.9068e-084	1.0920e-091	6.5178e-077	2.5756e+001	0.0000e+000	2.6338e-003
8.0000e+000	1.0000e+002	1	1.5256e-095	3.8068e-104	2.5628e-087	2.6322e+001	0.0000e+000	2.6579e-003
8.0000e+000	1.0500e+002	1	3.1479e-060	1.3859e-065	4.1673e-055	2.4258e+001	0.0000e+000	2.5513e-003
8.0000e+000	1.1000e+002	1	8.6577e-050	3.4651e-054	1.3896e-045	2.3399e+001	0.0000e+000	2.5437e-003
8.0000e+000	1.1500e+002	1	5.7949e-023	6.6466e-025	4.1648e-021	1.9822e+001	0.0000e+000	2.6457e-003
8.0000e+000	1.2000e+002	1	1.7682e-005	7.7203e-006	3.9175e-005	1.2331e+001	0.0000e+000	8.9003e-004
9.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6235e-003
9.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	2.6332e-003
9.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.0000e+001	1	1.9528e-240	2.2254e-262	1.8542e-219	3.0394e+001	0.0000e+000	2.6228e-003
9.0000e+000	9.5000e+001	1	2.4815e-084	6.6523e-092	4.3084e-077	2.5766e+001	0.0000e+000	2.6402e-003
9.0000e+000	1.0000e+002	1	8.4609e-096	1.9998e-104	1.4970e-087	2.6334e+001	0.0000e+000	2.6712e-003
9.0000e+000	1.0500e+002	1	6.7919e-059	3.9649e-064	6.8659e-054	2.4158e+001	0.0000e+000	2.5913e-003
9.0000e+000	1.1000e+002	1	2.6241e-049	1.1628e-053	3.8214e-045	2.3355e+001	0.0000e+000	2.5626e-003
9.0000e+000	1.1500e+002	1	7.4632e-023	8.7603e-025	5.2467e-021	1.9799e+001	0.0000e+000	2.6437e-003
9.0000e+000	1.2000e+002	1	6.8308e-020	1.4934e-021	2.6497e-018	1.9138e+001	0.0000e+000	2.5804e-003

Tabla 5. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Numero_de_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.349873e+001
5.000000e+000	7.500000e+001	1	2.339534e+001
5.000000e+000	8.000000e+001	1	2.327724e+001
5.000000e+000	8.500000e+001	1	2.311456e+001
5.000000e+000	9.000000e+001	1	2.290155e+001
5.000000e+000	9.500000e+001	1	2.262306e+001
5.000000e+000	1.000000e+002	1	2.228752e+001
5.000000e+000	1.050000e+002	1	2.188729e+001
5.000000e+000	1.100000e+002	1	2.139350e+001
5.000000e+000	1.150000e+002	1	2.081202e+001
5.000000e+000	1.200000e+002	1	2.013649e+001
6.000000e+000	7.000000e+001	1	2.349873e+001
6.000000e+000	7.500000e+001	1	2.339534e+001
6.000000e+000	8.000000e+001	1	2.327724e+001
6.000000e+000	8.500000e+001	1	2.311456e+001
6.000000e+000	9.000000e+001	1	2.290155e+001
6.000000e+000	9.500000e+001	1	2.262306e+001
6.000000e+000	1.000000e+002	1	2.228752e+001
6.000000e+000	1.050000e+002	1	2.188729e+001
6.000000e+000	1.100000e+002	1	2.139350e+001
6.000000e+000	1.150000e+002	1	2.081202e+001
6.000000e+000	1.200000e+002	1	2.013649e+001
7.000000e+000	7.000000e+001	1	2.349873e+001
7.000000e+000	7.500000e+001	1	2.339534e+001
7.000000e+000	8.000000e+001	1	2.327724e+001
7.000000e+000	8.500000e+001	1	2.311456e+001
7.000000e+000	9.000000e+001	1	2.290155e+001
7.000000e+000	9.500000e+001	1	2.262306e+001
7.000000e+000	1.000000e+002	1	2.228752e+001
7.000000e+000	1.050000e+002	1	2.188729e+001
7.000000e+000	1.100000e+002	1	2.139350e+001
7.000000e+000	1.150000e+002	1	2.081202e+001
7.000000e+000	1.200000e+002	1	2.013649e+001
8.000000e+000	7.000000e+001	1	2.349873e+001
8.000000e+000	7.500000e+001	1	2.339534e+001
8.000000e+000	8.000000e+001	1	2.327724e+001
8.000000e+000	8.500000e+001	1	2.311456e+001
8.000000e+000	9.000000e+001	1	2.290155e+001
8.000000e+000	9.500000e+001	1	2.262306e+001
8.000000e+000	1.000000e+002	1	2.228752e+001
8.000000e+000	1.050000e+002	1	2.188729e+001
8.000000e+000	1.100000e+002	1	2.139350e+001
8.000000e+000	1.150000e+002	1	2.081202e+001
8.000000e+000	1.200000e+002	1	2.013649e+001
9.000000e+000	7.000000e+001	1	2.349873e+001
9.000000e+000	7.500000e+001	1	2.339534e+001
9.000000e+000	8.000000e+001	1	2.327724e+001
9.000000e+000	8.500000e+001	1	2.311456e+001
9.000000e+000	9.000000e+001	1	2.290155e+001
9.000000e+000	9.500000e+001	1	2.262306e+001
9.000000e+000	1.000000e+002	1	2.228752e+001
9.000000e+000	1.050000e+002	1	2.188729e+001
9.000000e+000	1.100000e+002	1	2.139350e+001
9.000000e+000	1.150000e+002	1	2.081202e+001
9.000000e+000	1.200000e+002	1	2.013649e+001

Tabla 6. Medidas de OSNR. Configuración 5 mono canal, con equalizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	Long_smf	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	7.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.4985e-003
5.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.0500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
5.0000e+000	1.1000e+002	1	6.7673e-051	2.1435e-055	1.3584e-046	2.3498e+001	0.0000e+000	3.6342e-003
5.0000e+000	1.1500e+002	1	1.1321e-021	1.7031e-023	6.2779e-020	1.9547e+001	0.0000e+000	3.4586e-003
5.0000e+000	1.2000e+002	1	1.8366e-011	2.3393e-012	1.3215e-010	1.6413e+001	0.0000e+000	2.7774e-003
6.0000e+000	7.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5187e-003
6.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5040e-003
6.0000e+000	8.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5046e-003
6.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	9.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.0000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.0500e+002	1	1.0194e-073	2.5847e-080	2.0660e-067	2.5165e+001	0.0000e+000	3.4130e-003
6.0000e+000	1.1000e+002	1	5.1485e-063	1.2572e-068	1.1973e-057	2.4462e+001	0.0000e+000	3.4451e-003
6.0000e+000	1.1500e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
6.0000e+000	1.2000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5010e-003
7.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5124e-003
7.0000e+000	8.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.4862e-003
7.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
7.0000e+000	9.5000e+001	1	2.6590e-154	2.5944e-168	6.5978e-141	2.8444e+001	0.0000e+000	3.4705e-003
7.0000e+000	1.0000e+002	1	1.8147e-127	5.2280e-139	1.9596e-116	2.7600e+001	0.0000e+000	3.5296e-003
7.0000e+000	1.0500e+002	1	2.0546e-072	6.8664e-079	3.1983e-066	2.5085e+001	0.0000e+000	3.4943e-003
7.0000e+000	1.1000e+002	1	1.0405e-066	1.1628e-072	5.1081e-061	2.4718e+001	0.0000e+000	3.4198e-003
7.0000e+000	1.1500e+002	1	9.0470e-031	2.0064e-033	3.1279e-028	2.1193e+001	0.0000e+000	3.5327e-003
7.0000e+000	1.2000e+002	1	5.6615e-006	2.2359e-006	1.3807e-005	1.2850e+001	0.0000e+000	1.1419e-003
8.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5048e-003
8.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5187e-003
8.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
8.0000e+000	9.0000e+001	1	9.8813e-324	0.0000e+000	1.9956e-295	3.1698e+001	0.0000e+000	3.5211e-003
8.0000e+000	9.5000e+001	1	3.7503e-108	6.4735e-118	8.0960e-099	2.6872e+001	0.0000e+000	3.5122e-003
8.0000e+000	1.0000e+002	1	6.4830e-126	2.5957e-137	5.1110e-115	2.7546e+001	0.0000e+000	3.5394e-003
8.0000e+000	1.0500e+002	1	3.9099e-080	2.5491e-087	2.9029e-073	2.5538e+001	0.0000e+000	3.4067e-003
8.0000e+000	1.1000e+002	1	3.0198e-066	3.7220e-072	1.3501e-060	2.4686e+001	0.0000e+000	3.4015e-003
8.0000e+000	1.1500e+002	1	6.6424e-030	1.7680e-032	1.9290e-027	2.1061e+001	0.0000e+000	3.5499e-003
8.0000e+000	1.2000e+002	1	3.6289e-006	1.3779e-006	9.1889e-006	1.3037e+001	0.0000e+000	1.1784e-003
9.0000e+000	7.0000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5004e-003
9.0000e+000	7.5000e+001	1	0.0000e+000	0.0000e+000	0.0000e+000	6.3010e+001	0.0000e+000	3.5145e-003
9.0000e+000	8.0000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	8.5000e+001	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	9.0000e+001	1	4.4466e-323	0.0000e+000	7.9031e-295	3.1689e+001	0.0000e+000	3.5014e-003
9.0000e+000	9.5000e+001	1	1.3367e-108	2.0983e-118	3.1596e-099	2.6891e+001	0.0000e+000	3.5209e-003
9.0000e+000	1.0000e+002	1	2.4606e-088	2.8256e-096	9.6076e-081	2.5973e+001	0.0000e+000	3.5415e-003
9.0000e+000	1.0500e+002	1	2.0246e-078	1.8975e-085	1.0625e-071	2.5442e+001	0.0000e+000	3.4604e-003
9.0000e+000	1.1000e+002	1	1.0000e+000	1.0000e+000	1.0000e+000	0.0000e+000	0.0000e+000	0.0000e+000
9.0000e+000	1.1500e+002	1	7.7514e-030	2.0925e-032	2.2208e-027	2.1050e+001	0.0000e+000	3.5420e-003
9.0000e+000	1.2000e+002	1	2.8674e-025	2.0253e-027	3.2759e-023	2.0273e+001	0.0000e+000	3.4794e-003

Tabla 7. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Numero_taps	Long_smf	RUN#	Opt. SNR(dB)
5.000000e+000	7.000000e+001	1	2.357308e+001
5.000000e+000	7.500000e+001	1	2.349356e+001
5.000000e+000	8.000000e+001	1	2.340589e+001
5.000000e+000	8.500000e+001	1	2.328153e+001
5.000000e+000	9.000000e+001	1	2.311603e+001
5.000000e+000	9.500000e+001	1	2.289388e+001
5.000000e+000	1.000000e+002	1	2.262527e+001
5.000000e+000	1.050000e+002	1	2.230263e+001
5.000000e+000	1.100000e+002	1	2.189313e+001
5.000000e+000	1.150000e+002	1	2.140131e+001
5.000000e+000	1.200000e+002	1	2.081663e+001
6.000000e+000	7.000000e+001	1	2.357308e+001
6.000000e+000	7.500000e+001	1	2.349356e+001
6.000000e+000	8.000000e+001	1	2.340589e+001
6.000000e+000	8.500000e+001	1	2.328153e+001
6.000000e+000	9.000000e+001	1	2.311603e+001
6.000000e+000	9.500000e+001	1	2.289388e+001
6.000000e+000	1.000000e+002	1	2.262527e+001
6.000000e+000	1.050000e+002	1	2.230263e+001
6.000000e+000	1.100000e+002	1	2.189313e+001
6.000000e+000	1.150000e+002	1	2.140131e+001
6.000000e+000	1.200000e+002	1	2.081663e+001
7.000000e+000	7.000000e+001	1	2.357308e+001
7.000000e+000	7.500000e+001	1	2.349356e+001
7.000000e+000	8.000000e+001	1	2.340589e+001
7.000000e+000	8.500000e+001	1	2.328153e+001
7.000000e+000	9.000000e+001	1	2.311603e+001
7.000000e+000	9.500000e+001	1	2.289388e+001
7.000000e+000	1.000000e+002	1	2.262527e+001
7.000000e+000	1.050000e+002	1	2.230263e+001
7.000000e+000	1.100000e+002	1	2.189313e+001
7.000000e+000	1.150000e+002	1	2.140131e+001
7.000000e+000	1.200000e+002	1	2.081663e+001
8.000000e+000	7.000000e+001	1	2.357308e+001
8.000000e+000	7.500000e+001	1	2.349356e+001
8.000000e+000	8.000000e+001	1	2.340589e+001
8.000000e+000	8.500000e+001	1	2.328153e+001
8.000000e+000	9.000000e+001	1	2.311603e+001
8.000000e+000	9.500000e+001	1	2.289388e+001
8.000000e+000	1.000000e+002	1	2.262527e+001
8.000000e+000	1.050000e+002	1	2.230263e+001
8.000000e+000	1.100000e+002	1	2.189313e+001
8.000000e+000	1.150000e+002	1	2.140131e+001
8.000000e+000	1.200000e+002	1	2.081663e+001
9.000000e+000	7.000000e+001	1	2.357308e+001
9.000000e+000	7.500000e+001	1	2.349356e+001
9.000000e+000	8.000000e+001	1	2.340589e+001
9.000000e+000	8.500000e+001	1	2.328153e+001
9.000000e+000	9.000000e+001	1	2.311603e+001
9.000000e+000	9.500000e+001	1	2.289388e+001
9.000000e+000	1.000000e+002	1	2.262527e+001
9.000000e+000	1.050000e+002	1	2.230263e+001
9.000000e+000	1.100000e+002	1	2.189313e+001
9.000000e+000	1.150000e+002	1	2.140131e+001
9.000000e+000	1.200000e+002	1	2.081663e+001

Tabla 8. Medidas de OSNR. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-OOK. Rango de SMF-28 de 70 a 120 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Anexo V: Diagramas del ojo configuración 5 con ecualizadores FFE-NL, DFE y, FFE-NL y DFE en cascada en el lugar del receptor, cuatro canales y formato de modulación NRZ-OOK.

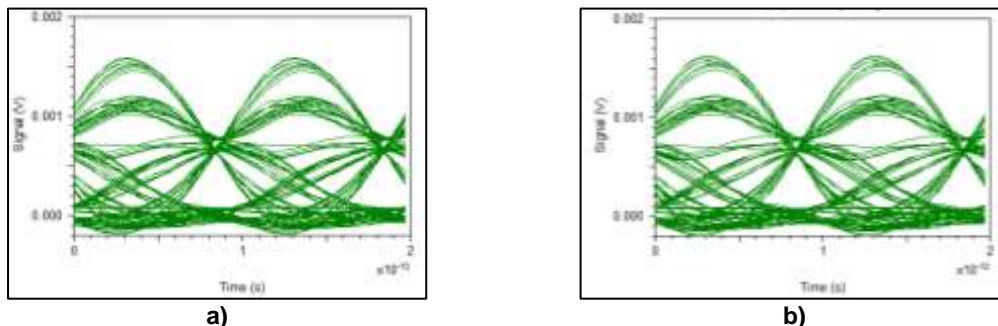


Figura 1. Diagrama del ojo del canal a) 18, b) 21. Configuración 5 cuatro canales, con un ecualizador FFE-NL en el lugar del receptor y formato de modulación NRZ-OOK.

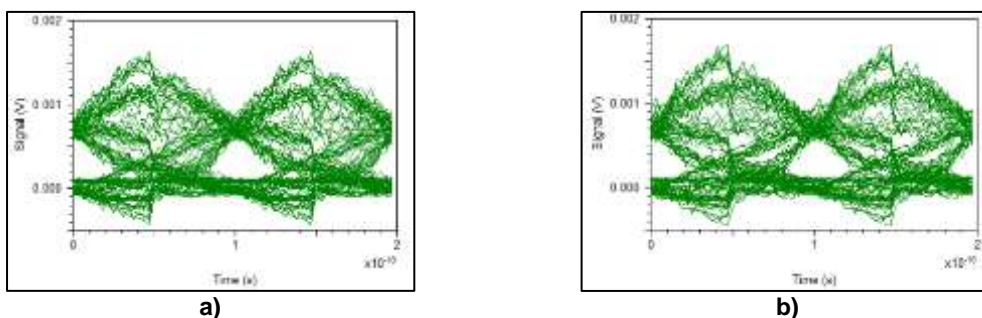


Figura 2. Diagrama del ojo del canal a) 18, b) 21. Configuración 5 cuatro canales, con un ecualizador DFE en el lugar del receptor y formato de modulación NRZ-OOK.

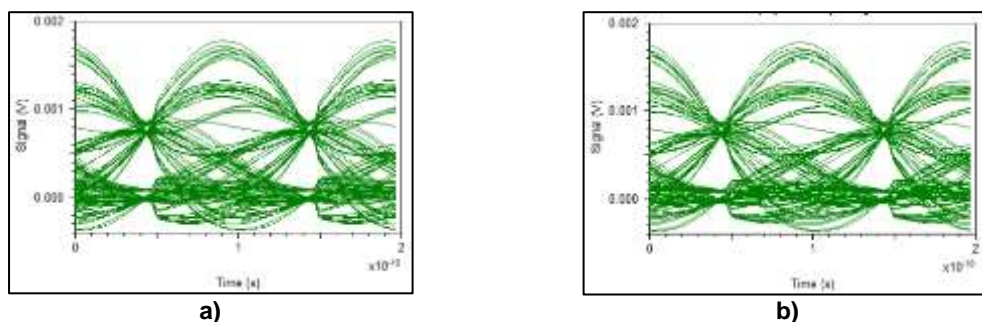


Figura 3. Diagrama del ojo del canal a) 18, b) 21. Configuración 5 cuatro canales, con un ecualizador en cascada FFE-NL y DFE en el lugar del receptor y formato de modulación NRZ-OOK.

Anexo W: Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato de modulación NRZ-DPSK.

Numero_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q ² (dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	2.5399e-070	5.6455e-080	3.9401e-061	2.4954e+001	0.0000e+000	8.9674e-004
5.0000e+000	8.5000e+001	1	3.8009e-058	8.8660e-067	1.1437e-049	2.4100e+001	0.0000e+000	8.6998e-004
5.0000e+000	9.0000e+001	1	2.9948e-049	8.8052e-057	1.7786e-041	2.3349e+001	0.0000e+000	8.3786e-004
5.0000e+000	9.5000e+001	1	3.6662e-042	2.0075e-049	3.1011e-035	2.2642e+001	0.0000e+000	7.9397e-004
5.0000e+000	1.0000e+002	1	5.4953e-037	5.9638e-044	1.3603e-030	2.2043e+001	0.0000e+000	7.5707e-004
5.0000e+000	1.0500e+002	1	1.2934e-033	4.5479e-040	9.4475e-028	2.1603e+001	0.0000e+000	7.4065e-004
5.0000e+000	1.1000e+002	1	1.3713e-029	8.9335e-035	1.0485e-024	2.1012e+001	0.0000e+000	7.7244e-004
5.0000e+000	1.1500e+002	1	8.6326e-020	2.3131e-022	5.4031e-017	1.9113e+001	0.0000e+000	7.5684e-004
5.0000e+000	1.2000e+002	1	4.9622e-011	2.0262e-012	9.8512e-010	1.6216e+001	0.0000e+000	6.3063e-004
5.0000e+000	1.2500e+002	1	8.9251e-009	6.3003e-010	1.0878e-007	1.5013e+001	0.0000e+000	5.8572e-004
5.0000e+000	1.3000e+002	1	1.1217e-006	1.5023e-007	7.6744e-006	1.3498e+001	0.0000e+000	5.3081e-004
6.0000e+000	8.0000e+001	1	6.1173e-061	5.0165e-069	1.7282e-052	2.4311e+001	0.0000e+000	9.0857e-004
6.0000e+000	8.5000e+001	1	7.6214e-058	2.4152e-065	1.3420e-050	2.4076e+001	0.0000e+000	8.7916e-004
6.0000e+000	9.0000e+001	1	5.3812e-049	4.8339e-056	1.9613e-042	2.3326e+001	0.0000e+000	8.4684e-004
6.0000e+000	9.5000e+001	1	7.8763e-035	6.0170e-040	4.4801e-030	2.1766e+001	0.0000e+000	7.9853e-004
6.0000e+000	1.0000e+002	1	2.0090e-045	2.8628e-052	5.7489e-039	2.2982e+001	0.0000e+000	8.1622e-004
6.0000e+000	1.0500e+002	1	4.0773e-032	3.5791e-038	1.3190e-026	2.1392e+001	0.0000e+000	7.6197e-004
6.0000e+000	1.1000e+002	1	1.0532e-028	1.2322e-033	1.0548e-023	2.0870e+001	0.0000e+000	7.9923e-004
6.0000e+000	1.1500e+002	1	1.7065e-019	5.4446e-022	6.6985e-017	1.9041e+001	0.0000e+000	7.3824e-004
6.0000e+000	1.2000e+002	1	3.7894e-014	6.9463e-016	1.6535e-012	1.7475e+001	0.0000e+000	6.8721e-004
6.0000e+000	1.2500e+002	1	3.3162e-010	1.7418e-011	5.1984e-009	1.5812e+001	0.0000e+000	6.0150e-004
6.0000e+000	1.3000e+002	1	1.1621e-007	1.0834e-008	1.0477e-006	1.4272e+001	0.0000e+000	5.3335e-004
7.0000e+000	8.0000e+001	1	1.6754e-063	5.7839e-072	1.9877e-055	2.4496e+001	0.0000e+000	8.9985e-004
7.0000e+000	8.5000e+001	1	4.3234e-072	2.1125e-082	8.6916e-059	2.5065e+001	0.0000e+000	9.1400e-004
7.0000e+000	9.0000e+001	1	9.9218e-052	1.2536e-058	6.2483e-045	2.3572e+001	0.0000e+000	8.6507e-004
7.0000e+000	9.5000e+001	1	2.5789e-046	6.5058e-053	3.6137e-040	2.3070e+001	0.0000e+000	8.3412e-004
7.0000e+000	1.0000e+002	1	1.1396e-041	2.4401e-048	1.6777e-035	2.2589e+001	0.0000e+000	8.0802e-004
7.0000e+000	1.0500e+002	1	1.9084e-036	4.9525e-043	3.1613e-030	2.1975e+001	0.0000e+000	8.0298e-004
7.0000e+000	1.1000e+002	1	9.9073e-029	1.4344e-033	9.0568e-024	2.0874e+001	0.0000e+000	7.9879e-004
7.0000e+000	1.1500e+002	1	7.6411e-024	1.9871e-027	1.9401e-020	2.0000e+001	0.0000e+000	7.5391e-004
7.0000e+000	1.2000e+002	1	2.8770e-017	2.9941e-019	6.5941e-015	1.8455e+001	0.0000e+000	6.9237e-004
7.0000e+000	1.2500e+002	1	7.9807e-012	3.0905e-013	2.2570e-010	1.6572e+001	0.0000e+000	6.4301e-004
7.0000e+000	1.3000e+002	1	1.1138e-008	9.0839e-010	1.1503e-007	1.4953e+001	0.0000e+000	5.7862e-004
8.0000e+000	8.0000e+001	1	2.5269e-067	1.1318e-076	1.9636e-058	2.4759e+001	0.0000e+000	8.9571e-004
8.0000e+000	8.5000e+001	1	7.2089e-069	2.3114e-079	1.7139e-056	2.4861e+001	0.0000e+000	9.0458e-004
8.0000e+000	9.0000e+001	1	1.3756e-053	3.8877e-060	4.7638e-047	2.3731e+001	0.0000e+000	8.7604e-004
8.0000e+000	9.5000e+001	1	1.1176e-047	9.3901e-054	1.7536e-041	2.3202e+001	0.0000e+000	8.4897e-004
8.0000e+000	1.0000e+002	1	1.7561e-040	2.0720e-046	1.1758e-034	2.2457e+001	0.0000e+000	8.3084e-004
8.0000e+000	1.0500e+002	1	1.4592e-035	1.4288e-041	1.2173e-029	2.1862e+001	0.0000e+000	8.0461e-004
8.0000e+000	1.1000e+002	1	1.8368e-028	2.6064e-033	1.5959e-023	2.0831e+001	0.0000e+000	7.7974e-004
8.0000e+000	1.1500e+002	1	2.2972e-023	7.7403e-027	4.7167e-020	1.9904e+001	0.0000e+000	7.5488e-004
8.0000e+000	1.2000e+002	1	6.6033e-018	4.5115e-020	2.6409e-015	1.8631e+001	0.0000e+000	6.8908e-004
8.0000e+000	1.2500e+002	1	3.0273e-012	9.9245e-014	1.0728e-010	1.6750e+001	0.0000e+000	6.3932e-004
8.0000e+000	1.3000e+002	1	2.5746e-009	1.8332e-010	3.0416e-008	1.5332e+001	0.0000e+000	6.1826e-004
9.0000e+000	8.0000e+001	1	1.5417e-062	1.8089e-071	2.8916e-053	2.4428e+001	0.0000e+000	8.9146e-004
9.0000e+000	8.5000e+001	1	9.0495e-068	7.1098e-078	7.2182e-056	2.4788e+001	0.0000e+000	9.0982e-004
9.0000e+000	9.0000e+001	1	6.1465e-052	2.8604e-058	1.0303e-045	2.3590e+001	0.0000e+000	8.6810e-004
9.0000e+000	9.5000e+001	1	4.5188e-046	4.7082e-052	2.5841e-040	2.3046e+001	0.0000e+000	8.5116e-004
9.0000e+000	1.0000e+002	1	9.4372e-041	1.0992e-046	6.9161e-035	2.2487e+001	0.0000e+000	8.3078e-004
9.0000e+000	1.0500e+002	1	5.8087e-036	5.4986e-042	5.5063e-030	2.1914e+001	0.0000e+000	8.0364e-004
9.0000e+000	1.1000e+002	1	8.5908e-028	1.0070e-032	8.4689e-023	2.0719e+001	0.0000e+000	7.9195e-004
9.0000e+000	1.1500e+002	1	5.4826e-024	6.4231e-028	3.6426e-020	2.0028e+001	0.0000e+000	7.2395e-004
9.0000e+000	1.2000e+002	1	7.0626e-018	3.5526e-020	4.3527e-015	1.8623e+001	0.0000e+000	6.8364e-004
9.0000e+000	1.2500e+002	1	2.4596e-012	7.4364e-014	1.0508e-010	1.6787e+001	0.0000e+000	6.2868e-004
9.0000e+000	1.3000e+002	1	2.9358e-009	2.2672e-010	3.2176e-008	1.5299e+001	0.0000e+000	5.8083e-004

Tabla 1. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.883170e+001
5.000000e+000	8.500000e+001	1	1.872133e+001
5.000000e+000	9.000000e+001	1	1.858098e+001
5.000000e+000	9.500000e+001	1	1.840819e+001
5.000000e+000	1.000000e+002	1	1.820006e+001
5.000000e+000	1.050000e+002	1	1.794673e+001
5.000000e+000	1.100000e+002	1	1.763406e+001
5.000000e+000	1.150000e+002	1	1.725468e+001
5.000000e+000	1.200000e+002	1	1.679752e+001
5.000000e+000	1.250000e+002	1	1.625390e+001
5.000000e+000	1.300000e+002	1	1.562147e+001
6.000000e+000	8.000000e+001	1	1.883170e+001
6.000000e+000	8.500000e+001	1	1.872133e+001
6.000000e+000	9.000000e+001	1	1.858098e+001
6.000000e+000	9.500000e+001	1	1.840819e+001
6.000000e+000	1.000000e+002	1	1.820006e+001
6.000000e+000	1.050000e+002	1	1.794673e+001
6.000000e+000	1.100000e+002	1	1.763406e+001
6.000000e+000	1.150000e+002	1	1.725468e+001
6.000000e+000	1.200000e+002	1	1.679752e+001
6.000000e+000	1.250000e+002	1	1.625390e+001
6.000000e+000	1.300000e+002	1	1.562147e+001
7.000000e+000	8.000000e+001	1	1.883170e+001
7.000000e+000	8.500000e+001	1	1.872133e+001
7.000000e+000	9.000000e+001	1	1.858098e+001
7.000000e+000	9.500000e+001	1	1.840819e+001
7.000000e+000	1.000000e+002	1	1.820006e+001
7.000000e+000	1.050000e+002	1	1.794673e+001
7.000000e+000	1.100000e+002	1	1.763406e+001
7.000000e+000	1.150000e+002	1	1.725468e+001
7.000000e+000	1.200000e+002	1	1.679752e+001
7.000000e+000	1.250000e+002	1	1.625390e+001
7.000000e+000	1.300000e+002	1	1.562147e+001
8.000000e+000	8.000000e+001	1	1.883170e+001
8.000000e+000	8.500000e+001	1	1.872133e+001
8.000000e+000	9.000000e+001	1	1.858098e+001
8.000000e+000	9.500000e+001	1	1.840819e+001
8.000000e+000	1.000000e+002	1	1.820006e+001
8.000000e+000	1.050000e+002	1	1.794673e+001
8.000000e+000	1.100000e+002	1	1.763406e+001
8.000000e+000	1.150000e+002	1	1.725468e+001
8.000000e+000	1.200000e+002	1	1.679752e+001
8.000000e+000	1.250000e+002	1	1.625390e+001
8.000000e+000	1.300000e+002	1	1.562147e+001
9.000000e+000	8.000000e+001	1	1.883170e+001
9.000000e+000	8.500000e+001	1	1.872133e+001
9.000000e+000	9.000000e+001	1	1.858098e+001
9.000000e+000	9.500000e+001	1	1.840819e+001
9.000000e+000	1.000000e+002	1	1.820006e+001
9.000000e+000	1.050000e+002	1	1.794673e+001
9.000000e+000	1.100000e+002	1	1.763406e+001
9.000000e+000	1.150000e+002	1	1.725468e+001
9.000000e+000	1.200000e+002	1	1.679752e+001
9.000000e+000	1.250000e+002	1	1.625390e+001
9.000000e+000	1.300000e+002	1	1.562147e+001

Tabla 2. Medidas de OSNR. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	5.7317e-073	3.8059e-082	2.9280e-063	2.5120e+001	0.0000e+000	1.8974e-003
5.0000e+000	8.5000e+001	1	3.8199e-058	9.2835e-067	1.0599e-049	2.4100e+001	0.0000e+000	1.7404e-003
5.0000e+000	9.0000e+001	1	2.0452e-049	6.0768e-057	1.4260e-041	2.3365e+001	0.0000e+000	1.6766e-003
5.0000e+000	9.5000e+001	1	1.7929e-042	9.0928e-050	2.0331e-035	2.2676e+001	0.0000e+000	1.5881e-003
5.0000e+000	1.0000e+002	1	2.1641e-037	1.8530e-044	7.6549e-031	2.2093e+001	0.0000e+000	1.5133e-003
5.0000e+000	1.0500e+002	1	3.5024e-034	7.9748e-041	4.0282e-028	2.1680e+001	0.0000e+000	1.4793e-003
5.0000e+000	1.1000e+002	1	2.5640e-030	9.5224e-036	2.8028e-025	2.1125e+001	0.0000e+000	1.5417e-003
5.0000e+000	1.1500e+002	1	1.7401e-020	3.4903e-023	1.4406e-017	1.9279e+001	0.0000e+000	1.5192e-003
5.0000e+000	1.2000e+002	1	2.6132e-011	9.7576e-013	5.6518e-010	1.6344e+001	0.0000e+000	1.2671e-003
5.0000e+000	1.2500e+002	1	5.3712e-009	3.5498e-010	6.8794e-008	1.5146e+001	0.0000e+000	1.1770e-003
5.0000e+000	1.3000e+002	1	7.6885e-007	9.7594e-008	5.4936e-006	1.3636e+001	0.0000e+000	1.0672e-003
6.0000e+000	8.0000e+001	1	1.6021e-060	1.5169e-068	4.1455e-052	2.4280e+001	0.0000e+000	1.8166e-003
6.0000e+000	8.5000e+001	1	1.7984e-089	1.3678e-099	8.7866e-074	2.6030e+001	0.0000e+000	1.8359e-003
6.0000e+000	9.0000e+001	1	3.5204e-049	3.0802e-056	1.3339e-042	2.3343e+001	0.0000e+000	1.6949e-003
6.0000e+000	9.5000e+001	1	5.5247e-042	7.7255e-049	1.1469e-035	2.2623e+001	0.0000e+000	1.5975e-003
6.0000e+000	1.0000e+002	1	2.7418e-046	3.4914e-053	9.8295e-040	2.3068e+001	0.0000e+000	1.6364e-003
6.0000e+000	1.0500e+002	1	1.7209e-032	1.1125e-038	7.3043e-027	2.1445e+001	0.0000e+000	1.5214e-003
6.0000e+000	1.1000e+002	1	2.0493e-029	1.3718e-034	3.1605e-024	2.0984e+001	0.0000e+000	1.5981e-003
6.0000e+000	1.1500e+002	1	3.4449e-020	8.7007e-023	1.8001e-017	1.9209e+001	0.0000e+000	1.4880e-003
6.0000e+000	1.2000e+002	1	1.7910e-014	3.1137e-016	8.4235e-013	1.7588e+001	0.0000e+000	1.3837e-003
6.0000e+000	1.2500e+002	1	1.7458e-010	8.6610e-012	2.8828e-009	1.5953e+001	0.0000e+000	1.2117e-003
6.0000e+000	1.3000e+002	1	7.5309e-008	6.6770e-009	7.1048e-007	1.4406e+001	0.0000e+000	1.0739e-003
7.0000e+000	8.0000e+001	1	1.0047e-081	6.6395e-091	3.3793e-068	2.5626e+001	0.0000e+000	1.8749e-003
7.0000e+000	8.5000e+001	1	3.2995e-073	1.4217e-083	1.0817e-059	2.5134e+001	0.0000e+000	1.8303e-003
7.0000e+000	9.0000e+001	1	6.9767e-052	7.5692e-059	5.8526e-045	2.3585e+001	0.0000e+000	1.7286e-003
7.0000e+000	9.5000e+001	1	9.3589e-047	1.9111e-053	1.7003e-040	2.3113e+001	0.0000e+000	1.6682e-003
7.0000e+000	1.0000e+002	1	2.8343e-042	4.9607e-049	4.9134e-036	2.2655e+001	0.0000e+000	1.6201e-003
7.0000e+000	1.0500e+002	1	2.4490e-037	3.6708e-044	6.2057e-031	2.2086e+001	0.0000e+000	1.6064e-003
7.0000e+000	1.1000e+002	1	1.7807e-029	1.5606e-034	2.4600e-024	2.0994e+001	0.0000e+000	1.5971e-003
7.0000e+000	1.1500e+002	1	4.0259e-024	9.4442e-028	1.0733e-020	2.0055e+001	0.0000e+000	1.5051e-003
7.0000e+000	1.2000e+002	1	1.0718e-017	9.7513e-020	2.8956e-015	1.8574e+001	0.0000e+000	1.3921e-003
7.0000e+000	1.2500e+002	1	3.6267e-012	1.3661e-013	1.1432e-010	1.6717e+001	0.0000e+000	1.2915e-003
7.0000e+000	1.3000e+002	1	6.1421e-009	4.7507e-010	6.6919e-008	1.5111e+001	0.0000e+000	1.1699e-003
8.0000e+000	8.0000e+001	1	6.2328e-079	5.5723e-088	5.8808e-066	2.5471e+001	0.0000e+000	1.8741e-003
8.0000e+000	8.5000e+001	1	6.1124e-070	1.6027e-080	2.2014e-057	2.4930e+001	0.0000e+000	1.8099e-003
8.0000e+000	9.0000e+001	1	8.7742e-054	1.8754e-060	3.5592e-047	2.3748e+001	0.0000e+000	1.7495e-003
8.0000e+000	9.5000e+001	1	3.5859e-048	2.1784e-054	6.0341e-042	2.3249e+001	0.0000e+000	1.6984e-003
8.0000e+000	1.0000e+002	1	4.3923e-041	4.2559e-047	3.1735e-035	2.2524e+001	0.0000e+000	1.6631e-003
8.0000e+000	1.0500e+002	1	1.9500e-036	1.2439e-042	2.3397e-030	2.1974e+001	0.0000e+000	1.6091e-003
8.0000e+000	1.1000e+002	1	2.6183e-029	2.2315e-034	3.3640e-024	2.0967e+001	0.0000e+000	1.5604e-003
8.0000e+000	1.1500e+002	1	1.2226e-023	3.6631e-027	2.7066e-020	1.9959e+001	0.0000e+000	1.5067e-003
8.0000e+000	1.2000e+002	1	2.4973e-018	1.5154e-020	1.1712e-015	1.8744e+001	0.0000e+000	1.3856e-003
8.0000e+000	1.2500e+002	1	1.3518e-012	4.2779e-014	5.4083e-011	1.6892e+001	0.0000e+000	1.2842e-003
8.0000e+000	1.3000e+002	1	1.3922e-009	9.3556e-011	1.7468e-008	1.5481e+001	0.0000e+000	1.2469e-003
9.0000e+000	8.0000e+001	1	6.0630e-062	8.7893e-071	1.0028e-052	2.4385e+001	0.0000e+000	1.7784e-003
9.0000e+000	8.5000e+001	1	8.1523e-069	5.2265e-079	9.5335e-057	2.4857e+001	0.0000e+000	1.8197e-003
9.0000e+000	9.0000e+001	1	3.7015e-052	1.4205e-058	6.9053e-046	2.3609e+001	0.0000e+000	1.7350e-003
9.0000e+000	9.5000e+001	1	1.4413e-046	1.2118e-052	8.8469e-041	2.3095e+001	0.0000e+000	1.7029e-003
9.0000e+000	1.0000e+002	1	1.3540e-041	1.2392e-047	1.2114e-035	2.2581e+001	0.0000e+000	1.6647e-003
9.0000e+000	1.0500e+002	1	6.8442e-037	4.1738e-043	9.6509e-031	2.2031e+001	0.0000e+000	1.6072e-003
9.0000e+000	1.1000e+002	1	1.3317e-028	9.6846e-034	1.9624e-023	2.0853e+001	0.0000e+000	1.5832e-003
9.0000e+000	1.1500e+002	1	3.3635e-024	3.7704e-028	2.1993e-020	2.0070e+001	0.0000e+000	1.4533e-003
9.0000e+000	1.2000e+002	1	2.7613e-018	1.2220e-020	2.0048e-015	1.8732e+001	0.0000e+000	1.3749e-003
9.0000e+000	1.2500e+002	1	1.1166e-012	3.2027e-014	5.4494e-011	1.6926e+001	0.0000e+000	1.2633e-003
9.0000e+000	1.3000e+002	1	1.5798e-009	1.1499e-010	1.8374e-008	1.5451e+001	0.0000e+000	1.1747e-003

Tabla 3. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un equalizador FFE-NL en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.893777e+001
5.000000e+000	8.500000e+001	1	1.887100e+001
5.000000e+000	9.000000e+001	1	1.878622e+001
5.000000e+000	9.500000e+001	1	1.868372e+001
5.000000e+000	1.000000e+002	1	1.856394e+001
5.000000e+000	1.050000e+002	1	1.841996e+001
5.000000e+000	1.100000e+002	1	1.823938e+001
5.000000e+000	1.150000e+002	1	1.801614e+001
5.000000e+000	1.200000e+002	1	1.773789e+001
5.000000e+000	1.250000e+002	1	1.739200e+001
5.000000e+000	1.300000e+002	1	1.697048e+001
6.000000e+000	8.000000e+001	1	1.893777e+001
6.000000e+000	8.500000e+001	1	1.887100e+001
6.000000e+000	9.000000e+001	1	1.878622e+001
6.000000e+000	9.500000e+001	1	1.868372e+001
6.000000e+000	1.000000e+002	1	1.856394e+001
6.000000e+000	1.050000e+002	1	1.841996e+001
6.000000e+000	1.100000e+002	1	1.823938e+001
6.000000e+000	1.150000e+002	1	1.801614e+001
6.000000e+000	1.200000e+002	1	1.773789e+001
6.000000e+000	1.250000e+002	1	1.739200e+001
6.000000e+000	1.300000e+002	1	1.697048e+001
7.000000e+000	8.000000e+001	1	1.893777e+001
7.000000e+000	8.500000e+001	1	1.887100e+001
7.000000e+000	9.000000e+001	1	1.878622e+001
7.000000e+000	9.500000e+001	1	1.868372e+001
7.000000e+000	1.000000e+002	1	1.856394e+001
7.000000e+000	1.050000e+002	1	1.841996e+001
7.000000e+000	1.100000e+002	1	1.823938e+001
7.000000e+000	1.150000e+002	1	1.801614e+001
7.000000e+000	1.200000e+002	1	1.773789e+001
7.000000e+000	1.250000e+002	1	1.739200e+001
7.000000e+000	1.300000e+002	1	1.697048e+001
8.000000e+000	8.000000e+001	1	1.893777e+001
8.000000e+000	8.500000e+001	1	1.887100e+001
8.000000e+000	9.000000e+001	1	1.878622e+001
8.000000e+000	9.500000e+001	1	1.868372e+001
8.000000e+000	1.000000e+002	1	1.856394e+001
8.000000e+000	1.050000e+002	1	1.841996e+001
8.000000e+000	1.100000e+002	1	1.823938e+001
8.000000e+000	1.150000e+002	1	1.801614e+001
8.000000e+000	1.200000e+002	1	1.773789e+001
8.000000e+000	1.250000e+002	1	1.739200e+001
8.000000e+000	1.300000e+002	1	1.697048e+001
9.000000e+000	8.000000e+001	1	1.893777e+001
9.000000e+000	8.500000e+001	1	1.887100e+001
9.000000e+000	9.000000e+001	1	1.878622e+001
9.000000e+000	9.500000e+001	1	1.868372e+001
9.000000e+000	1.000000e+002	1	1.856394e+001
9.000000e+000	1.050000e+002	1	1.841996e+001
9.000000e+000	1.100000e+002	1	1.823938e+001
9.000000e+000	1.150000e+002	1	1.801614e+001
9.000000e+000	1.200000e+002	1	1.773789e+001
9.000000e+000	1.250000e+002	1	1.739200e+001
9.000000e+000	1.300000e+002	1	1.697048e+001

Tabla 4. Medidas de OSNR. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_de_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	9.0001e-076	2.3208e-085	1.4109e-065	2.5288e+001	0.0000e+000	2.8472e-003
5.0000e+000	8.5000e+001	1	5.5731e-058	1.5938e-066	1.2879e-049	2.4087e+001	0.0000e+000	2.6108e-003
5.0000e+000	9.0000e+001	1	1.8743e-049	6.2495e-057	1.3511e-041	2.3368e+001	0.0000e+000	2.5159e-003
5.0000e+000	9.5000e+001	1	1.1333e-042	4.8805e-050	1.6479e-035	2.2697e+001	0.0000e+000	2.3821e-003
5.0000e+000	1.0000e+002	1	1.0376e-037	7.5105e-045	4.9994e-031	2.2132e+001	0.0000e+000	2.2686e-003
5.0000e+000	1.0500e+002	1	1.1462e-034	1.8749e-041	2.0524e-028	2.1745e+001	0.0000e+000	2.2157e-003
5.0000e+000	1.1000e+002	1	5.5844e-031	1.2516e-036	8.5539e-026	2.1225e+001	0.0000e+000	2.3073e-003
5.0000e+000	1.1500e+002	1	3.5230e-021	5.2201e-024	3.8165e-018	1.9438e+001	0.0000e+000	2.2873e-003
5.0000e+000	1.2000e+002	1	1.3458e-011	4.5743e-013	3.1863e-010	1.6473e+001	0.0000e+000	1.9107e-003
5.0000e+000	1.2500e+002	1	3.2316e-009	2.0014e-010	4.3500e-008	1.5275e+001	0.0000e+000	1.7739e-003
5.0000e+000	1.3000e+002	1	5.2288e-007	6.2830e-008	3.9014e-006	1.3773e+001	0.0000e+000	1.6094e-003
6.0000e+000	8.0000e+001	1	5.9463e-060	7.4749e-068	1.2752e-051	2.4238e+001	0.0000e+000	2.7231e-003
6.0000e+000	8.5000e+001	1	8.8374e-091	3.9657e-101	7.6367e-075	2.6094e+001	0.0000e+000	2.7570e-003
6.0000e+000	9.0000e+001	1	2.9576e-049	2.7168e-056	1.1034e-042	2.3350e+001	0.0000e+000	2.5439e-003
6.0000e+000	9.5000e+001	1	1.0754e-035	5.1170e-041	9.5719e-031	2.1879e+001	0.0000e+000	2.3968e-003
6.0000e+000	1.0000e+002	1	5.1824e-047	6.3576e-054	2.1959e-040	2.3138e+001	0.0000e+000	2.4591e-003
6.0000e+000	1.0500e+002	1	8.7458e-033	4.5003e-039	4.6459e-027	2.1487e+001	0.0000e+000	2.2780e-003
6.0000e+000	1.1000e+002	1	4.4880e-030	1.7357e-035	9.9233e-025	2.1087e+001	0.0000e+000	2.3970e-003
6.0000e+000	1.1500e+002	1	6.8118e-021	1.3603e-023	4.6975e-018	1.9373e+001	0.0000e+000	2.2501e-003
6.0000e+000	1.2000e+002	1	8.7345e-015	1.4471e-016	4.4306e-013	1.7694e+001	0.0000e+000	2.0807e-003
6.0000e+000	1.2500e+002	1	9.1285e-011	4.2952e-012	1.5890e-009	1.6090e+001	0.0000e+000	1.8322e-003
6.0000e+000	1.3000e+002	1	6.7893e-008	6.0229e-009	6.4339e-007	1.4438e+001	0.0000e+000	1.6010e-003
7.0000e+000	8.0000e+001	1	3.8539e-083	1.7079e-092	2.6015e-069	2.5703e+001	0.0000e+000	2.8164e-003
7.0000e+000	8.5000e+001	1	4.1446e-074	1.4658e-084	1.8334e-060	2.5189e+001	0.0000e+000	2.7456e-003
7.0000e+000	9.0000e+001	1	7.3377e-052	7.4201e-059	7.2405e-045	2.3583e+001	0.0000e+000	2.5904e-003
7.0000e+000	9.5000e+001	1	4.8061e-047	8.6904e-054	1.0925e-040	2.3141e+001	0.0000e+000	2.5018e-003
7.0000e+000	1.0000e+002	1	9.8502e-043	1.5886e-049	1.8563e-036	2.2704e+001	0.0000e+000	2.4346e-003
7.0000e+000	1.0500e+002	1	3.7770e-038	3.4823e-045	1.3270e-031	2.2185e+001	0.0000e+000	2.4091e-003
7.0000e+000	1.1000e+002	1	3.5103e-030	1.8636e-035	6.8577e-025	2.1104e+001	0.0000e+000	2.3953e-003
7.0000e+000	1.1500e+002	1	2.5755e-024	5.7423e-028	6.9026e-021	2.0092e+001	0.0000e+000	2.2496e-003
7.0000e+000	1.2000e+002	1	4.2815e-018	3.3797e-020	1.3370e-015	1.8682e+001	0.0000e+000	2.0989e-003
7.0000e+000	1.2500e+002	1	1.6637e-012	6.1140e-014	5.8470e-011	1.6856e+001	0.0000e+000	1.9459e-003
7.0000e+000	1.3000e+002	1	5.2595e-009	3.8291e-010	6.1562e-008	1.5151e+001	0.0000e+000	1.7985e-003
8.0000e+000	8.0000e+001	1	2.4303e-080	1.5774e-089	4.4612e-067	2.5550e+001	0.0000e+000	2.8111e-003
8.0000e+000	8.5000e+001	1	7.7938e-071	1.5846e-081	3.6312e-058	2.4987e+001	0.0000e+000	2.7153e-003
8.0000e+000	9.0000e+001	1	8.2697e-054	1.4579e-060	3.5888e-047	2.3750e+001	0.0000e+000	2.6205e-003
8.0000e+000	9.5000e+001	1	1.6199e-048	7.6092e-055	2.7878e-042	2.3281e+001	0.0000e+000	2.5482e-003
8.0000e+000	1.0000e+002	1	1.4468e-041	1.2125e-047	1.0345e-035	2.2577e+001	0.0000e+000	2.4962e-003
8.0000e+000	1.0500e+002	1	3.0535e-037	1.3048e-043	4.7158e-031	2.2074e+001	0.0000e+000	2.4130e-003
8.0000e+000	1.1000e+002	1	3.9907e-030	2.0401e-035	7.1533e-025	2.1095e+001	0.0000e+000	2.3422e-003
8.0000e+000	1.1500e+002	1	7.7451e-024	2.1475e-027	1.7797e-020	1.9999e+001	0.0000e+000	2.2509e-003
8.0000e+000	1.2000e+002	1	1.0240e-018	5.5021e-021	5.4909e-016	1.8845e+001	0.0000e+000	2.0896e-003
8.0000e+000	1.2500e+002	1	6.1077e-013	1.8724e-014	2.7557e-011	1.7029e+001	0.0000e+000	1.9352e-003
8.0000e+000	1.3000e+002	1	7.6347e-010	4.8666e-011	1.0146e-008	1.5623e+001	0.0000e+000	1.8860e-003
9.0000e+000	8.0000e+001	1	3.2849e-061	6.7383e-070	4.2061e-052	2.4331e+001	0.0000e+000	2.6623e-003
9.0000e+000	8.5000e+001	1	1.0947e-069	5.4983e-080	1.5996e-057	2.4914e+001	0.0000e+000	2.7291e-003
9.0000e+000	9.0000e+001	1	3.2289e-052	1.1063e-058	6.1971e-046	2.3614e+001	0.0000e+000	2.6007e-003
9.0000e+000	9.5000e+001	1	6.3423e-047	4.6321e-053	4.0026e-041	2.3130e+001	0.0000e+000	2.5549e-003
9.0000e+000	1.0000e+002	1	4.1490e-042	3.2321e-048	3.6967e-036	2.2637e+001	0.0000e+000	2.4974e-003
9.0000e+000	1.0500e+002	1	9.5171e-038	3.8424e-044	1.7806e-031	2.2136e+001	0.0000e+000	2.4101e-003
9.0000e+000	1.1000e+002	1	2.1153e-029	9.6332e-035	4.3640e-024	2.0982e+001	0.0000e+000	2.3742e-003
9.0000e+000	1.1500e+002	1	2.5202e-024	2.8512e-028	1.5429e-020	2.0094e+001	0.0000e+000	2.1871e-003
9.0000e+000	1.2000e+002	1	1.1744e-018	4.5798e-021	9.7783e-016	1.8829e+001	0.0000e+000	2.0738e-003
9.0000e+000	1.2500e+002	1	5.1417e-013	1.4012e-014	2.8613e-011	1.7058e+001	0.0000e+000	1.9044e-003
9.0000e+000	1.3000e+002	1	8.6409e-010	5.9708e-011	1.0626e-008	1.5594e+001	0.0000e+000	1.7815e-003

Tabla 5. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un equalizador FFE-NL en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.895100e+001
5.000000e+000	8.500000e+001	1	1.889957e+001
5.000000e+000	9.000000e+001	1	1.883459e+001
5.000000e+000	9.500000e+001	1	1.875758e+001
5.000000e+000	1.000000e+002	1	1.867062e+001
5.000000e+000	1.050000e+002	1	1.856860e+001
5.000000e+000	1.100000e+002	1	1.844073e+001
5.000000e+000	1.150000e+002	1	1.828279e+001
5.000000e+000	1.200000e+002	1	1.808361e+001
5.000000e+000	1.250000e+002	1	1.783084e+001
5.000000e+000	1.300000e+002	1	1.751586e+001
6.000000e+000	8.000000e+001	1	1.895100e+001
6.000000e+000	8.500000e+001	1	1.889957e+001
6.000000e+000	9.000000e+001	1	1.883459e+001
6.000000e+000	9.500000e+001	1	1.875758e+001
6.000000e+000	1.000000e+002	1	1.867062e+001
6.000000e+000	1.050000e+002	1	1.856860e+001
6.000000e+000	1.100000e+002	1	1.844073e+001
6.000000e+000	1.150000e+002	1	1.828279e+001
6.000000e+000	1.200000e+002	1	1.808361e+001
6.000000e+000	1.250000e+002	1	1.783084e+001
6.000000e+000	1.300000e+002	1	1.751586e+001
7.000000e+000	8.000000e+001	1	1.895100e+001
7.000000e+000	8.500000e+001	1	1.889957e+001
7.000000e+000	9.000000e+001	1	1.883459e+001
7.000000e+000	9.500000e+001	1	1.875758e+001
7.000000e+000	1.000000e+002	1	1.867062e+001
7.000000e+000	1.050000e+002	1	1.856860e+001
7.000000e+000	1.100000e+002	1	1.844073e+001
7.000000e+000	1.150000e+002	1	1.828279e+001
7.000000e+000	1.200000e+002	1	1.808361e+001
7.000000e+000	1.250000e+002	1	1.783084e+001
7.000000e+000	1.300000e+002	1	1.751586e+001
8.000000e+000	8.000000e+001	1	1.895100e+001
8.000000e+000	8.500000e+001	1	1.889957e+001
8.000000e+000	9.000000e+001	1	1.883459e+001
8.000000e+000	9.500000e+001	1	1.875758e+001
8.000000e+000	1.000000e+002	1	1.867062e+001
8.000000e+000	1.050000e+002	1	1.856860e+001
8.000000e+000	1.100000e+002	1	1.844073e+001
8.000000e+000	1.150000e+002	1	1.828279e+001
8.000000e+000	1.200000e+002	1	1.808361e+001
8.000000e+000	1.250000e+002	1	1.783084e+001
8.000000e+000	1.300000e+002	1	1.751586e+001
9.000000e+000	8.000000e+001	1	1.895100e+001
9.000000e+000	8.500000e+001	1	1.889957e+001
9.000000e+000	9.000000e+001	1	1.883459e+001
9.000000e+000	9.500000e+001	1	1.875758e+001
9.000000e+000	1.000000e+002	1	1.867062e+001
9.000000e+000	1.050000e+002	1	1.856860e+001
9.000000e+000	1.100000e+002	1	1.844073e+001
9.000000e+000	1.150000e+002	1	1.828279e+001
9.000000e+000	1.200000e+002	1	1.808361e+001
9.000000e+000	1.250000e+002	1	1.783084e+001
9.000000e+000	1.300000e+002	1	1.751586e+001

Tabla 6. Medidas de OSNR. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q ² (dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	1.0968e-078	1.1007e-088	5.4790e-068	2.5457e+001	0.0000e+000	3.7970e-003
5.0000e+000	8.5000e+001	1	1.0583e-057	3.7990e-066	1.9005e-049	2.4065e+001	0.0000e+000	3.4811e-003
5.0000e+000	9.0000e+001	1	2.1613e-049	8.2104e-057	1.5237e-041	2.3362e+001	0.0000e+000	3.3557e-003
5.0000e+000	9.5000e+001	1	8.3991e-043	3.8304e-050	1.3990e-035	2.2711e+001	0.0000e+000	3.1762e-003
5.0000e+000	1.0000e+002	1	5.8846e-038	3.8281e-045	3.6922e-031	2.2162e+001	0.0000e+000	3.0230e-003
5.0000e+000	1.0500e+002	1	4.4454e-035	5.7208e-042	1.2185e-028	2.1799e+001	0.0000e+000	2.9501e-003
5.0000e+000	1.1000e+002	1	1.4345e-031	2.0921e-037	3.0162e-026	2.1312e+001	0.0000e+000	3.0694e-003
5.0000e+000	1.1500e+002	1	7.2609e-022	7.8077e-025	1.0216e-018	1.9589e+001	0.0000e+000	3.0609e-003
5.0000e+000	1.2000e+002	1	6.8704e-012	2.1186e-013	1.7876e-010	1.6600e+001	0.0000e+000	2.5526e-003
5.0000e+000	1.2500e+002	1	1.9376e-009	1.1268e-010	2.7431e-008	1.5401e+001	0.0000e+000	2.3763e-003
5.0000e+000	1.3000e+002	1	3.5263e-007	4.0085e-008	2.7474e-006	1.3909e+001	0.0000e+000	2.1573e-003
6.0000e+000	8.0000e+001	1	9.6756e-104	5.2792e-116	1.1977e-087	2.6688e+001	0.0000e+000	3.7933e-003
6.0000e+000	8.5000e+001	1	6.4889e-092	1.7199e-102	8.6688e-076	2.6150e+001	0.0000e+000	3.6790e-003
6.0000e+000	9.0000e+001	1	3.0863e-049	3.1484e-056	1.0891e-042	2.3348e+001	0.0000e+000	3.3940e-003
6.0000e+000	9.5000e+001	1	2.2403e-042	2.9238e-049	5.2095e-036	2.2666e+001	0.0000e+000	3.1966e-003
6.0000e+000	1.0000e+002	1	1.2970e-047	1.6369e-054	6.1363e-041	2.3196e+001	0.0000e+000	3.2842e-003
6.0000e+000	1.0500e+002	1	1.5161e-040	3.0665e-047	2.2475e-034	2.2464e+001	0.0000e+000	3.2117e-003
6.0000e+000	1.1000e+002	1	1.1376e-030	2.6062e-036	3.3963e-025	2.1178e+001	0.0000e+000	3.1960e-003
6.0000e+000	1.1500e+002	1	1.3484e-021	2.1160e-024	1.2235e-018	1.9531e+001	0.0000e+000	3.0245e-003
6.0000e+000	1.2000e+002	1	4.3930e-015	6.9149e-017	2.4147e-013	1.7792e+001	0.0000e+000	2.7809e-003
6.0000e+000	1.2500e+002	1	4.7594e-011	2.1321e-012	8.7516e-010	1.6224e+001	0.0000e+000	2.4630e-003
6.0000e+000	1.3000e+002	1	4.2709e-008	3.5973e-009	4.2377e-007	1.4576e+001	0.0000e+000	2.1473e-003
7.0000e+000	8.0000e+001	1	1.7419e-084	4.9686e-094	2.2247e-070	2.5774e+001	0.0000e+000	3.7550e-003
7.0000e+000	8.5000e+001	1	6.5226e-075	1.8638e-085	3.5801e-061	2.5237e+001	0.0000e+000	3.6607e-003
7.0000e+000	9.0000e+001	1	1.0289e-051	1.0148e-058	1.1084e-044	2.3570e+001	0.0000e+000	3.4503e-003
7.0000e+000	9.5000e+001	1	3.2326e-047	5.5000e-054	8.9703e-041	2.3158e+001	0.0000e+000	3.3349e-003
7.0000e+000	1.0000e+002	1	4.4872e-043	7.3028e-050	8.7256e-037	2.2740e+001	0.0000e+000	3.2515e-003
7.0000e+000	1.0500e+002	1	6.9594e-039	4.2064e-046	3.1638e-032	2.2272e+001	0.0000e+000	3.2112e-003
7.0000e+000	1.1000e+002	1	7.7876e-031	2.5398e-036	2.0342e-025	2.1203e+001	0.0000e+000	3.1935e-003
7.0000e+000	1.1500e+002	1	1.9020e-024	4.1765e-028	4.9781e-021	2.0118e+001	0.0000e+000	2.9888e-003
7.0000e+000	1.2000e+002	1	1.8113e-018	1.2306e-020	6.4227e-016	1.8780e+001	0.0000e+000	2.8131e-003
7.0000e+000	1.2500e+002	1	7.7057e-013	2.7545e-014	3.0224e-011	1.6989e+001	0.0000e+000	2.6063e-003
7.0000e+000	1.3000e+002	1	2.9211e-009	2.0445e-010	3.6138e-008	1.5300e+001	0.0000e+000	2.4238e-003
8.0000e+000	8.0000e+001	1	1.0813e-081	4.8653e-091	3.6648e-068	2.5624e+001	0.0000e+000	3.7469e-003
8.0000e+000	8.5000e+001	1	1.1961e-071	1.8763e-082	6.7183e-059	2.5038e+001	0.0000e+000	3.6208e-003
8.0000e+000	9.0000e+001	1	1.0508e-053	1.6135e-060	4.6527e-047	2.3741e+001	0.0000e+000	3.4891e-003
8.0000e+000	9.5000e+001	1	9.7045e-049	3.7056e-055	1.6575e-042	2.3302e+001	0.0000e+000	3.3982e-003
8.0000e+000	1.0000e+002	1	6.1659e-042	4.7095e-048	4.1302e-036	2.2618e+001	0.0000e+000	3.3285e-003
8.0000e+000	1.0500e+002	1	5.6912e-038	1.6912e-044	1.0379e-031	2.2163e+001	0.0000e+000	3.2162e-003
8.0000e+000	1.1000e+002	1	6.5438e-031	2.0211e-036	1.5634e-025	2.1214e+001	0.0000e+000	3.1251e-003
8.0000e+000	1.1500e+002	1	5.5630e-024	1.4659e-027	1.2934e-020	2.0027e+001	0.0000e+000	2.9890e-003
8.0000e+000	1.2000e+002	1	4.4918e-019	2.1295e-021	2.6912e-016	1.8936e+001	0.0000e+000	2.8010e-003
8.0000e+000	1.2500e+002	1	2.7953e-013	8.2904e-015	1.4214e-011	1.7159e+001	0.0000e+000	2.5923e-003
8.0000e+000	1.3000e+002	1	4.2171e-010	2.5601e-011	5.9264e-009	1.5758e+001	0.0000e+000	2.5354e-003
9.0000e+000	8.0000e+001	1	2.8925e-076	1.1179e-086	2.4083e-063	2.5317e+001	0.0000e+000	3.6880e-003
9.0000e+000	8.5000e+001	1	1.7566e-070	6.8786e-081	2.9927e-058	2.4964e+001	0.0000e+000	3.6380e-003
9.0000e+000	9.0000e+001	1	3.7309e-052	1.1957e-058	7.0768e-046	2.3609e+001	0.0000e+000	3.4654e-003
9.0000e+000	9.5000e+001	1	3.6259e-047	2.4343e-053	2.3009e-041	2.3153e+001	0.0000e+000	3.4066e-003
9.0000e+000	1.0000e+002	1	1.1011e-042	2.2408e-049	2.0060e-036	2.2699e+001	0.0000e+000	3.2310e-003
9.0000e+000	1.0500e+002	1	1.5818e-038	4.3784e-045	3.5854e-032	2.2230e+001	0.0000e+000	3.2124e-003
9.0000e+000	1.1000e+002	1	3.5659e-030	1.0319e-035	9.7773e-025	2.1103e+001	0.0000e+000	3.1650e-003
9.0000e+000	1.1500e+002	1	2.1816e-024	2.5795e-028	1.2066e-020	2.0106e+001	0.0000e+000	2.9254e-003
9.0000e+000	1.2000e+002	1	5.3588e-019	1.8457e-021	4.9823e-016	1.8917e+001	0.0000e+000	2.7805e-003
9.0000e+000	1.2500e+002	1	2.4047e-013	6.2106e-015	1.5217e-011	1.7183e+001	0.0000e+000	2.5521e-003
9.0000e+000	1.3000e+002	1	4.7598e-010	3.1387e-011	6.1785e-009	1.5731e+001	0.0000e+000	2.4014e-003

Tabla 7. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un equalizador FFE-NL en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.894026e+001
5.000000e+000	8.500000e+001	1	1.889669e+001
5.000000e+000	9.000000e+001	1	1.884188e+001
5.000000e+000	9.500000e+001	1	1.877801e+001
5.000000e+000	1.000000e+002	1	1.870816e+001
5.000000e+000	1.050000e+002	1	1.862830e+001
5.000000e+000	1.100000e+002	1	1.852877e+001
5.000000e+000	1.150000e+002	1	1.840670e+001
5.000000e+000	1.200000e+002	1	1.825208e+001
5.000000e+000	1.250000e+002	1	1.805347e+001
5.000000e+000	1.300000e+002	1	1.780279e+001
6.000000e+000	8.000000e+001	1	1.894026e+001
6.000000e+000	8.500000e+001	1	1.889669e+001
6.000000e+000	9.000000e+001	1	1.884188e+001
6.000000e+000	9.500000e+001	1	1.877801e+001
6.000000e+000	1.000000e+002	1	1.870816e+001
6.000000e+000	1.050000e+002	1	1.862830e+001
6.000000e+000	1.100000e+002	1	1.852877e+001
6.000000e+000	1.150000e+002	1	1.840670e+001
6.000000e+000	1.200000e+002	1	1.825208e+001
6.000000e+000	1.250000e+002	1	1.805347e+001
6.000000e+000	1.300000e+002	1	1.780279e+001
7.000000e+000	8.000000e+001	1	1.894026e+001
7.000000e+000	8.500000e+001	1	1.889669e+001
7.000000e+000	9.000000e+001	1	1.884188e+001
7.000000e+000	9.500000e+001	1	1.877801e+001
7.000000e+000	1.000000e+002	1	1.870816e+001
7.000000e+000	1.050000e+002	1	1.862830e+001
7.000000e+000	1.100000e+002	1	1.852877e+001
7.000000e+000	1.150000e+002	1	1.840670e+001
7.000000e+000	1.200000e+002	1	1.825208e+001
7.000000e+000	1.250000e+002	1	1.805347e+001
7.000000e+000	1.300000e+002	1	1.780279e+001
8.000000e+000	8.000000e+001	1	1.894026e+001
8.000000e+000	8.500000e+001	1	1.889669e+001
8.000000e+000	9.000000e+001	1	1.884188e+001
8.000000e+000	9.500000e+001	1	1.877801e+001
8.000000e+000	1.000000e+002	1	1.870816e+001
8.000000e+000	1.050000e+002	1	1.862830e+001
8.000000e+000	1.100000e+002	1	1.852877e+001
8.000000e+000	1.150000e+002	1	1.840670e+001
8.000000e+000	1.200000e+002	1	1.825208e+001
8.000000e+000	1.250000e+002	1	1.805347e+001
8.000000e+000	1.300000e+002	1	1.780279e+001
9.000000e+000	8.000000e+001	1	1.894026e+001
9.000000e+000	8.500000e+001	1	1.889669e+001
9.000000e+000	9.000000e+001	1	1.884188e+001
9.000000e+000	9.500000e+001	1	1.877801e+001
9.000000e+000	1.000000e+002	1	1.870816e+001
9.000000e+000	1.050000e+002	1	1.862830e+001
9.000000e+000	1.100000e+002	1	1.852877e+001
9.000000e+000	1.150000e+002	1	1.840670e+001
9.000000e+000	1.200000e+002	1	1.825208e+001
9.000000e+000	1.250000e+002	1	1.805347e+001
9.000000e+000	1.300000e+002	1	1.780279e+001

Tabla 8. Medidas de OSNR. Configuración 5 mono canal, con un ecualizador FFE-NL en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Anexo X: Configuración 5 mono canal, con ecualizador DFE en el lugar del receptor, y formato de modulación NRZ-DPSK.

Numero	taps	smf_length_k	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	4.3312e-071	4.8021e-079	2.1967e-062	2.5003e+001	0.0000e+000	9.0480e-004	
5.0000e+000	8.5000e+001	1	7.9642e-060	1.5207e-067	1.5686e-052	2.4228e+001	0.0000e+000	8.7761e-004	
5.0000e+000	9.0000e+001	1	6.8077e-051	4.7286e-058	4.0871e-044	2.3499e+001	0.0000e+000	8.5026e-004	
5.0000e+000	9.5000e+001	1	4.7135e-043	4.4701e-050	1.4466e-036	2.2738e+001	0.0000e+000	8.0244e-004	
5.0000e+000	1.0000e+002	1	3.0485e-045	8.1300e-052	7.3451e-039	2.2964e+001	0.0000e+000	8.2875e-004	
5.0000e+000	1.0500e+002	1	5.2639e-040	2.0734e-047	3.3138e-033	2.2402e+001	0.0000e+000	8.0937e-004	
5.0000e+000	1.1000e+002	1	1.2920e-030	1.5143e-035	9.9824e-026	2.1170e+001	0.0000e+000	7.7415e-004	
5.0000e+000	1.1500e+002	1	3.1738e-020	7.4635e-023	3.3484e-017	1.9217e+001	0.0000e+000	7.5187e-004	
5.0000e+000	1.2000e+002	1	3.0866e-014	5.6257e-016	2.0848e-012	1.7506e+001	0.0000e+000	6.6508e-004	
5.0000e+000	1.2500e+002	1	7.0814e-012	2.8709e-013	1.7669e-010	1.6594e+001	0.0000e+000	6.3194e-004	
5.0000e+000	1.3000e+002	1	1.8792e-009	1.3230e-010	2.2959e-008	1.5409e+001	0.0000e+000	6.0407e-004	
6.0000e+000	7.0000e+001	1	3.7449e-071	6.4182e-082	3.7406e-061	2.5007e+001	0.0000e+000	9.3648e-004	
6.0000e+000	7.5000e+001	1	6.2263e-068	1.3430e-078	4.9145e-058	2.4799e+001	0.0000e+000	9.1849e-004	
6.0000e+000	8.0000e+001	1	1.2234e-064	3.8333e-073	4.1458e-056	2.4576e+001	0.0000e+000	8.9721e-004	
6.0000e+000	8.5000e+001	1	1.5321e-081	1.9076e-093	8.2443e-067	2.5616e+001	0.0000e+000	9.0934e-004	
6.0000e+000	9.0000e+001	1	1.2328e-046	3.1057e-053	2.3089e-040	2.3102e+001	0.0000e+000	8.4222e-004	
6.0000e+000	9.5000e+001	1	9.2346e-058	1.5412e-065	1.7420e-050	2.4070e+001	0.0000e+000	8.4513e-004	
6.0000e+000	1.0000e+002	1	5.3754e-041	1.6044e-047	5.7125e-035	2.2514e+001	0.0000e+000	8.1886e-004	
6.0000e+000	1.0500e+002	1	1.3601e-036	5.4825e-043	1.7530e-030	2.1994e+001	0.0000e+000	8.0987e-004	
6.0000e+000	1.1000e+002	1	1.2186e-028	3.1962e-033	8.2436e-024	2.0860e+001	0.0000e+000	7.8675e-004	
6.0000e+000	1.1500e+002	1	9.1604e-020	3.1025e-022	5.2758e-017	1.9107e+001	0.0000e+000	7.4354e-004	
6.0000e+000	1.2000e+002	1	3.4249e-014	5.9651e-016	1.5792e-012	1.7490e+001	0.0000e+000	6.8670e-004	
6.0000e+000	1.2500e+002	1	8.0851e-011	3.4137e-012	1.5467e-009	1.6115e+001	0.0000e+000	6.1494e-004	
6.0000e+000	1.3000e+002	1	1.4543e-009	9.9533e-011	1.8017e-008	1.5471e+001	0.0000e+000	5.8649e-004	
7.0000e+000	8.0000e+001	1	6.9027e-068	3.5764e-077	1.2757e-058	2.4796e+001	0.0000e+000	9.9376e-004	
7.0000e+000	8.5000e+001	1	3.6223e-070	2.4174e-080	1.7024e-057	2.4944e+001	0.0000e+000	9.0316e-004	
7.0000e+000	9.0000e+001	1	1.5082e-054	2.0184e-061	4.7408e-048	2.3812e+001	0.0000e+000	8.7321e-004	
7.0000e+000	9.5000e+001	1	5.1266e-048	2.9838e-054	6.1151e-042	2.3234e+001	0.0000e+000	8.4675e-004	
7.0000e+000	1.0000e+002	1	3.0542e-040	3.7011e-046	1.4870e-034	2.2429e+001	0.0000e+000	8.3144e-004	
7.0000e+000	1.0500e+002	1	1.4023e-035	1.8508e-041	1.0368e-029	2.1864e+001	0.0000e+000	8.1047e-004	
7.0000e+000	1.1000e+002	1	7.3582e-029	1.5824e-033	5.7738e-024	2.0895e+001	0.0000e+000	7.9029e-004	
7.0000e+000	1.1500e+002	1	1.8184e-023	6.7550e-027	3.4105e-020	1.9925e+001	0.0000e+000	7.5202e-004	
7.0000e+000	1.2000e+002	1	4.4347e-017	4.9456e-019	9.2148e-015	1.8401e+001	0.0000e+000	6.8978e-004	
7.0000e+000	1.2500e+002	1	8.1828e-013	2.0379e-014	3.0953e-011	1.6979e+001	0.0000e+000	6.6744e-004	
7.0000e+000	1.3000e+002	1	8.5070e-010	4.8628e-011	1.2269e-008	1.5598e+001	0.0000e+000	6.3086e-004	
8.0000e+000	8.0000e+001	1	8.0190e-062	1.5030e-070	1.7391e-053	2.4376e+001	0.0000e+000	8.8551e-004	
8.0000e+000	8.5000e+001	1	2.7315e-066	9.9245e-077	4.4776e-054	2.4689e+001	0.0000e+000	8.9415e-004	
8.0000e+000	9.0000e+001	1	1.7439e-053	3.4324e-060	5.6310e-047	2.3723e+001	0.0000e+000	8.7242e-004	
8.0000e+000	9.5000e+001	1	8.1093e-048	4.4717e-054	1.0164e-041	2.3215e+001	0.0000e+000	8.4948e-004	
8.0000e+000	1.0000e+002	1	1.1350e-042	1.0205e-048	1.6413e-036	2.2697e+001	0.0000e+000	8.2697e-004	
8.0000e+000	1.0500e+002	1	1.0072e-035	1.6106e-041	7.4120e-030	2.1883e+001	0.0000e+000	8.0357e-004	
8.0000e+000	1.1000e+002	1	1.9050e-027	3.7587e-032	1.5392e-022	2.0661e+001	0.0000e+000	7.7736e-004	
8.0000e+000	1.1500e+002	1	3.9018e-023	1.5625e-026	8.3225e-020	1.9857e+001	0.0000e+000	7.3783e-004	
8.0000e+000	1.2000e+002	1	1.1279e-017	8.6677e-020	3.8583e-015	1.8568e+001	0.0000e+000	6.8700e-004	
8.0000e+000	1.2500e+002	1	7.5612e-013	2.1462e-014	3.4634e-011	1.6993e+001	0.0000e+000	6.4277e-004	
8.0000e+000	1.3000e+002	1	6.2871e-010	3.6056e-011	9.0478e-009	1.5668e+001	0.0000e+000	6.3142e-004	
9.0000e+000	8.0000e+001	1	1.3002e-064	1.1279e-073	1.9028e-055	2.4574e+001	0.0000e+000	8.9413e-004	
9.0000e+000	8.5000e+001	1	5.4972e-071	3.0841e-082	1.2472e-059	2.4996e+001	0.0000e+000	9.2547e-004	
9.0000e+000	9.0000e+001	1	3.6094e-052	3.5960e-059	1.6266e-045	2.3610e+001	0.0000e+000	8.5618e-004	
9.0000e+000	9.5000e+001	1	4.6770e-047	1.3427e-053	7.4608e-041	2.3142e+001	0.0000e+000	8.4353e-004	
9.0000e+000	1.0000e+002	1	2.8309e-042	2.4271e-048	3.6812e-036	2.2655e+001	0.0000e+000	8.2468e-004	
9.0000e+000	1.0500e+002	1	3.3342e-035	5.5999e-041	2.1173e-029	2.1816e+001	0.0000e+000	8.0250e-004	
9.0000e+000	1.1000e+002	1	2.2123e-026	2.4504e-031	8.2615e-022	2.0476e+001	0.0000e+000	7.3907e-004	
9.0000e+000	1.1500e+002	1	5.1600e-023	9.6476e-027	3.4578e-019	1.9832e+001	0.0000e+000	7.1093e-004	
9.0000e+000	1.2000e+002	1	1.2319e-017	7.0787e-020	6.3871e-015	1.8557e+001	0.0000e+000	6.8162e-004	
9.0000e+000	1.2500e+002	1	3.1001e-013	5.9954e-015	1.7375e-011	1.7142e+001	0.0000e+000	6.4933e-004	
9.0000e+000	1.3000e+002	1	1.6089e-010	6.7862e-012	3.1127e-009	1.5970e+001	0.0000e+000	6.3020e-004	

Tabla 1. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un ecualizador DFE en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.883170e+001
5.000000e+000	8.500000e+001	1	1.872133e+001
5.000000e+000	9.000000e+001	1	1.858098e+001
5.000000e+000	9.500000e+001	1	1.840819e+001
5.000000e+000	1.000000e+002	1	1.820006e+001
5.000000e+000	1.050000e+002	1	1.794673e+001
5.000000e+000	1.100000e+002	1	1.763406e+001
5.000000e+000	1.150000e+002	1	1.725468e+001
5.000000e+000	1.200000e+002	1	1.679752e+001
5.000000e+000	1.250000e+002	1	1.625390e+001
5.000000e+000	1.300000e+002	1	1.562147e+001
6.000000e+000	8.000000e+001	1	1.883170e+001
6.000000e+000	8.500000e+001	1	1.872133e+001
6.000000e+000	9.000000e+001	1	1.858098e+001
6.000000e+000	9.500000e+001	1	1.840819e+001
6.000000e+000	1.000000e+002	1	1.820006e+001
6.000000e+000	1.050000e+002	1	1.794673e+001
6.000000e+000	1.100000e+002	1	1.763406e+001
6.000000e+000	1.150000e+002	1	1.725468e+001
6.000000e+000	1.200000e+002	1	1.679752e+001
6.000000e+000	1.250000e+002	1	1.625390e+001
6.000000e+000	1.300000e+002	1	1.562147e+001
7.000000e+000	8.000000e+001	1	1.883170e+001
7.000000e+000	8.500000e+001	1	1.872133e+001
7.000000e+000	9.000000e+001	1	1.858098e+001
7.000000e+000	9.500000e+001	1	1.840819e+001
7.000000e+000	1.000000e+002	1	1.820006e+001
7.000000e+000	1.050000e+002	1	1.794673e+001
7.000000e+000	1.100000e+002	1	1.763406e+001
7.000000e+000	1.150000e+002	1	1.725468e+001
7.000000e+000	1.200000e+002	1	1.679752e+001
7.000000e+000	1.250000e+002	1	1.625390e+001
7.000000e+000	1.300000e+002	1	1.562147e+001
8.000000e+000	8.000000e+001	1	1.883170e+001
8.000000e+000	8.500000e+001	1	1.872133e+001
8.000000e+000	9.000000e+001	1	1.858098e+001
8.000000e+000	9.500000e+001	1	1.840819e+001
8.000000e+000	1.000000e+002	1	1.820006e+001
8.000000e+000	1.050000e+002	1	1.794673e+001
8.000000e+000	1.100000e+002	1	1.763406e+001
8.000000e+000	1.150000e+002	1	1.725468e+001
8.000000e+000	1.200000e+002	1	1.679752e+001
8.000000e+000	1.250000e+002	1	1.625390e+001
8.000000e+000	1.300000e+002	1	1.562147e+001
9.000000e+000	8.000000e+001	1	1.883170e+001
9.000000e+000	8.500000e+001	1	1.872133e+001
9.000000e+000	9.000000e+001	1	1.858098e+001
9.000000e+000	9.500000e+001	1	1.840819e+001
9.000000e+000	1.000000e+002	1	1.820006e+001
9.000000e+000	1.050000e+002	1	1.794673e+001
9.000000e+000	1.100000e+002	1	1.763406e+001
9.000000e+000	1.150000e+002	1	1.725468e+001
9.000000e+000	1.200000e+002	1	1.679752e+001
9.000000e+000	1.250000e+002	1	1.625390e+001
9.000000e+000	1.300000e+002	1	1.562147e+001

Tabla 2. Medidas de OSNR. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero	taps	smf_length	km	RUN#	BER	BER_lo	BER_hi	Q*(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	7.2634e-071	8.6292e-079	3.2002e-062	2.4989e+001	0.0000e+000	1.8091e-003		
5.0000e+000	8.5000e+001	1	7.0670e-060	1.4276e-067	1.3608e-052	2.4232e+001	0.0000e+000	1.7545e-003		
5.0000e+000	9.0000e+001	1	3.7013e-051	2.6137e-058	2.5024e-044	2.3522e+001	0.0000e+000	1.7018e-003		
5.0000e+000	9.5000e+001	1	1.9751e-043	1.7034e-050	6.9793e-037	2.2778e+001	0.0000e+000	1.6053e-003		
5.0000e+000	1.0000e+002	1	3.1862e-046	7.3429e-053	1.0625e-039	2.3061e+001	0.0000e+000	1.6622e-003		
5.0000e+000	1.0500e+002	1	2.7231e-041	4.8335e-049	3.3361e-034	2.2547e+001	0.0000e+000	1.6183e-003		
5.0000e+000	1.1000e+002	1	1.2820e-031	8.1178e-037	1.6648e-026	2.1319e+001	0.0000e+000	1.5471e-003		
5.0000e+000	1.1500e+002	1	7.4026e-021	1.2911e-023	9.9082e-018	1.9364e+001	0.0000e+000	1.5092e-003		
5.0000e+000	1.2000e+002	1	1.6124e-014	2.7184e-016	1.1978e-012	1.7604e+001	0.0000e+000	1.3347e-003		
5.0000e+000	1.2500e+002	1	3.9684e-012	1.5480e-013	1.0612e-010	1.6701e+001	0.0000e+000	1.2706e-003		
5.0000e+000	1.3000e+002	1	1.1448e-009	7.6697e-011	1.4791e-008	1.5528e+001	0.0000e+000	1.2173e-003		
6.0000e+000	8.0000e+001	1	3.4679e-064	1.2879e-072	1.1245e-055	2.4545e+001	0.0000e+000	1.7932e-003		
6.0000e+000	8.5000e+001	1	7.6574e-083	5.9621e-095	8.1195e-068	2.5687e+001	0.0000e+000	1.8223e-003		
6.0000e+000	9.0000e+001	1	8.0497e-047	1.8372e-053	1.6938e-040	2.3120e+001	0.0000e+000	1.6856e-003		
6.0000e+000	9.5000e+001	1	8.1512e-059	8.7903e-067	2.3251e-051	2.4151e+001	0.0000e+000	1.6907e-003		
6.0000e+000	1.0000e+002	1	1.1411e-041	2.6879e-048	1.5453e-035	2.2589e+001	0.0000e+000	1.6424e-003		
6.0000e+000	1.0500e+002	1	1.4701e-037	3.3753e-044	2.9906e-031	2.2113e+001	0.0000e+000	1.6203e-003		
6.0000e+000	1.1000e+002	1	1.8803e-029	2.9723e-034	2.0003e-024	2.0990e+001	0.0000e+000	1.5713e-003		
6.0000e+000	1.1500e+002	1	2.1419e-020	5.8145e-023	1.6032e-017	1.9257e+001	0.0000e+000	1.4966e-003		
6.0000e+000	1.2000e+002	1	1.7450e-014	2.9345e-016	8.5634e-013	1.7592e+001	0.0000e+000	1.3762e-003		
6.0000e+000	1.2500e+002	1	4.6928e-011	1.8926e-012	9.3946e-010	1.6227e+001	0.0000e+000	1.2362e-003		
6.0000e+000	1.3000e+002	1	8.9599e-010	5.8112e-011	1.1730e-008	1.5586e+001	0.0000e+000	1.1800e-003		
7.0000e+000	8.0000e+001	1	3.7540e-079	6.1579e-088	2.7548e-066	2.5483e+001	0.0000e+000	1.8717e-003		
7.0000e+000	8.5000e+001	1	3.2817e-071	1.8918e-081	2.3541e-058	2.5010e+001	0.0000e+000	1.8068e-003		
7.0000e+000	9.0000e+001	1	7.3473e-055	7.0968e-062	2.9676e-048	2.3837e+001	0.0000e+000	1.7437e-003		
7.0000e+000	9.5000e+001	1	1.2970e-048	5.1266e-055	1.8025e-042	2.3290e+001	0.0000e+000	1.6941e-003		
7.0000e+000	1.0000e+002	1	6.3734e-041	6.0917e-047	3.6162e-035	2.2506e+001	0.0000e+000	1.6635e-003		
7.0000e+000	1.0500e+002	1	1.5799e-036	1.3139e-042	1.8048e-030	2.1985e+001	0.0000e+000	1.6210e-003		
7.0000e+000	1.1000e+002	1	1.1777e-029	1.5592e-034	1.4493e-024	2.1022e+001	0.0000e+000	1.5782e-003		
7.0000e+000	1.1500e+002	1	9.2434e-024	3.0100e-027	1.9081e-020	1.9983e+001	0.0000e+000	1.4997e-003		
7.0000e+000	1.2000e+002	1	1.8386e-017	1.8223e-019	4.4254e-015	1.8509e+001	0.0000e+000	1.3864e-003		
7.0000e+000	1.2500e+002	1	4.1019e-013	9.8857e-015	1.6777e-011	1.7095e+001	0.0000e+000	1.3404e-003		
7.0000e+000	1.3000e+002	1	4.9595e-010	2.6920e-011	7.5035e-009	1.5722e+001	0.0000e+000	1.2685e-003		
8.0000e+000	8.0000e+001	1	7.1963e-075	4.9202e-084	1.8855e-062	2.5235e+001	0.0000e+000	1.8575e-003		
8.0000e+000	8.5000e+001	1	2.9833e-067	8.2704e-078	7.1446e-055	2.4754e+001	0.0000e+000	1.7888e-003		
8.0000e+000	9.0000e+001	1	1.0900e-053	1.6290e-060	4.1617e-047	2.3740e+001	0.0000e+000	1.7435e-003		
8.0000e+000	9.5000e+001	1	3.0567e-048	1.2615e-054	4.1657e-042	2.3255e+001	0.0000e+000	1.6995e-003		
8.0000e+000	1.0000e+002	1	2.4340e-043	1.6608e-049	3.8267e-037	2.2768e+001	0.0000e+000	1.6548e-003		
8.0000e+000	1.0500e+002	1	1.0585e-036	1.0474e-042	1.1961e-030	2.2007e+001	0.0000e+000	1.6074e-003		
8.0000e+000	1.1000e+002	1	2.7356e-028	3.4468e-033	3.3554e-023	2.0802e+001	0.0000e+000	1.5558e-003		
8.0000e+000	1.1500e+002	1	2.2254e-023	8.0468e-027	5.0584e-020	1.9907e+001	0.0000e+000	1.4785e-003		
8.0000e+000	1.2000e+002	1	4.7415e-018	3.3076e-020	1.8607e-015	1.8670e+001	0.0000e+000	1.3810e-003		
8.0000e+000	1.2500e+002	1	3.7987e-013	1.0510e-014	1.9285e-011	1.7108e+001	0.0000e+000	1.2908e-003		
8.0000e+000	1.3000e+002	1	4.2094e-010	2.3773e-011	6.3614e-009	1.5759e+001	0.0000e+000	1.2782e-003		
9.0000e+000	8.0000e+001	1	5.2188e-064	5.5599e-073	6.7709e-055	2.4532e+001	0.0000e+000	1.7839e-003		
9.0000e+000	8.5000e+001	1	4.0585e-072	1.4565e-083	1.3359e-060	2.5067e+001	0.0000e+000	1.8525e-003		
9.0000e+000	9.0000e+001	1	2.5340e-052	1.9397e-059	1.2982e-045	2.3623e+001	0.0000e+000	1.7106e-003		
9.0000e+000	9.5000e+001	1	1.9152e-047	4.0801e-054	3.4329e-041	2.3180e+001	0.0000e+000	1.6873e-003		
9.0000e+000	1.0000e+002	1	6.4639e-043	4.1876e-049	9.0680e-037	2.2723e+001	0.0000e+000	1.6501e-003		
9.0000e+000	1.0500e+002	1	5.9834e-037	5.0815e-043	8.2761e-031	2.2038e+001	0.0000e+000	1.6227e-003		
9.0000e+000	1.1000e+002	1	2.4153e-028	3.1708e-033	2.9602e-023	2.0811e+001	0.0000e+000	1.5599e-003		
9.0000e+000	1.1500e+002	1	3.1297e-023	5.5118e-027	2.2712e-019	1.9877e+001	0.0000e+000	1.4251e-003		
9.0000e+000	1.2000e+002	1	5.3382e-018	2.7585e-020	3.1980e-015	1.8656e+001	0.0000e+000	1.3704e-003		
9.0000e+000	1.2500e+002	1	1.5899e-013	2.9448e-015	9.6668e-012	1.7250e+001	0.0000e+000	1.3057e-003		
9.0000e+000	1.3000e+002	1	9.1258e-011	3.6651e-012	1.8670e-009	1.6090e+001	0.0000e+000	1.2681e-003		

Tabla 3. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.893777e+001
5.000000e+000	8.500000e+001	1	1.887100e+001
5.000000e+000	9.000000e+001	1	1.878622e+001
5.000000e+000	9.500000e+001	1	1.868372e+001
5.000000e+000	1.000000e+002	1	1.856394e+001
5.000000e+000	1.050000e+002	1	1.841996e+001
5.000000e+000	1.100000e+002	1	1.823938e+001
5.000000e+000	1.150000e+002	1	1.801614e+001
5.000000e+000	1.200000e+002	1	1.773789e+001
5.000000e+000	1.250000e+002	1	1.739200e+001
5.000000e+000	1.300000e+002	1	1.697048e+001
6.000000e+000	8.000000e+001	1	1.893777e+001
6.000000e+000	8.500000e+001	1	1.887100e+001
6.000000e+000	9.000000e+001	1	1.878622e+001
6.000000e+000	9.500000e+001	1	1.868372e+001
6.000000e+000	1.000000e+002	1	1.856394e+001
6.000000e+000	1.050000e+002	1	1.841996e+001
6.000000e+000	1.100000e+002	1	1.823938e+001
6.000000e+000	1.150000e+002	1	1.801614e+001
6.000000e+000	1.200000e+002	1	1.773789e+001
6.000000e+000	1.250000e+002	1	1.739200e+001
6.000000e+000	1.300000e+002	1	1.697048e+001
7.000000e+000	8.000000e+001	1	1.893777e+001
7.000000e+000	8.500000e+001	1	1.887100e+001
7.000000e+000	9.000000e+001	1	1.878622e+001
7.000000e+000	9.500000e+001	1	1.868372e+001
7.000000e+000	1.000000e+002	1	1.856394e+001
7.000000e+000	1.050000e+002	1	1.841996e+001
7.000000e+000	1.100000e+002	1	1.823938e+001
7.000000e+000	1.150000e+002	1	1.801614e+001
7.000000e+000	1.200000e+002	1	1.773789e+001
7.000000e+000	1.250000e+002	1	1.739200e+001
7.000000e+000	1.300000e+002	1	1.697048e+001
8.000000e+000	8.000000e+001	1	1.893777e+001
8.000000e+000	8.500000e+001	1	1.887100e+001
8.000000e+000	9.000000e+001	1	1.878622e+001
8.000000e+000	9.500000e+001	1	1.868372e+001
8.000000e+000	1.000000e+002	1	1.856394e+001
8.000000e+000	1.050000e+002	1	1.841996e+001
8.000000e+000	1.100000e+002	1	1.823938e+001
8.000000e+000	1.150000e+002	1	1.801614e+001
8.000000e+000	1.200000e+002	1	1.773789e+001
8.000000e+000	1.250000e+002	1	1.739200e+001
8.000000e+000	1.300000e+002	1	1.697048e+001
9.000000e+000	8.000000e+001	1	1.893777e+001
9.000000e+000	8.500000e+001	1	1.887100e+001
9.000000e+000	9.000000e+001	1	1.878622e+001
9.000000e+000	9.500000e+001	1	1.868372e+001
9.000000e+000	1.000000e+002	1	1.856394e+001
9.000000e+000	1.050000e+002	1	1.841996e+001
9.000000e+000	1.100000e+002	1	1.823938e+001
9.000000e+000	1.150000e+002	1	1.801614e+001
9.000000e+000	1.200000e+002	1	1.773789e+001
9.000000e+000	1.250000e+002	1	1.739200e+001
9.000000e+000	1.300000e+002	1	1.697048e+001

Tabla 4. Medidas de OSNR. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_de_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	6.6121e-081	1.1678e-092	2.5280e-068	2.5581e+001	0.0000e+000	2.8073e-003
5.0000e+000	8.5000e+001	1	9.1522e-060	2.0866e-067	1.5524e-052	2.4224e+001	0.0000e+000	2.6308e-003
5.0000e+000	9.0000e+001	1	2.7865e-051	2.1277e-058	1.9360e-044	2.3532e+001	0.0000e+000	2.5547e-003
5.0000e+000	9.5000e+001	1	1.0068e-043	8.2173e-051	4.0451e-037	2.2808e+001	0.0000e+000	2.4086e-003
5.0000e+000	1.0000e+002	1	4.2367e-047	8.9652e-054	1.9026e-040	2.3147e+001	0.0000e+000	2.4985e-003
5.0000e+000	1.0500e+002	1	1.6159e-042	1.3710e-050	3.6406e-035	2.2681e+001	0.0000e+000	2.4267e-003
5.0000e+000	1.1000e+002	1	1.3589e-032	4.5212e-038	2.8576e-027	2.1460e+001	0.0000e+000	2.3196e-003
5.0000e+000	1.1500e+002	1	1.7319e-021	2.2088e-024	2.9082e-018	1.9507e+001	0.0000e+000	2.2709e-003
5.0000e+000	1.2000e+002	1	8.7523e-015	1.3727e-016	7.0815e-013	1.7693e+001	0.0000e+000	2.0079e-003
5.0000e+000	1.2500e+002	1	2.2818e-012	8.6013e-014	6.5234e-011	1.6800e+001	0.0000e+000	1.9144e-003
5.0000e+000	1.3000e+002	1	7.0192e-010	4.4650e-011	9.6126e-009	1.5642e+001	0.0000e+000	1.8375e-003
6.0000e+000	8.0000e+001	1	1.5017e-063	7.6244e-072	4.2749e-055	2.4500e+001	0.0000e+000	2.6881e-003
6.0000e+000	8.5000e+001	1	8.3071e-084	4.3337e-096	1.3141e-068	2.5738e+001	0.0000e+000	2.7371e-003
6.0000e+000	9.0000e+001	1	6.9351e-047	1.5662e-053	1.5388e-040	2.3126e+001	0.0000e+000	2.5299e-003
6.0000e+000	9.5000e+001	1	1.2671e-059	1.0079e-067	5.2760e-052	2.4213e+001	0.0000e+000	2.5364e-003
6.0000e+000	1.0000e+002	1	3.1528e-042	6.4659e-049	5.1432e-036	2.2650e+001	0.0000e+000	2.4688e-003
6.0000e+000	1.0500e+002	1	1.8437e-038	2.5091e-045	5.3540e-032	2.2222e+001	0.0000e+000	2.4302e-003
6.0000e+000	1.1000e+002	1	3.1197e-030	2.9577e-035	4.9074e-025	2.1111e+001	0.0000e+000	2.3546e-003
6.0000e+000	1.1500e+002	1	4.8739e-021	1.0526e-023	4.6869e-018	1.9406e+001	0.0000e+000	2.2603e-003
6.0000e+000	1.2000e+002	1	9.1021e-015	1.4838e-016	4.7609e-013	1.7688e+001	0.0000e+000	2.0686e-003
6.0000e+000	1.2500e+002	1	2.7108e-011	1.0489e-012	5.6830e-010	1.6337e+001	0.0000e+000	1.8654e-003
6.0000e+000	1.3000e+002	1	5.5696e-010	3.4273e-011	7.7050e-009	1.5695e+001	0.0000e+000	1.7791e-003
7.0000e+000	8.0000e+001	1	1.5535e-080	1.7844e-089	2.2483e-067	2.5561e+001	0.0000e+000	2.8076e-003
7.0000e+000	8.5000e+001	1	4.5666e-072	2.1028e-082	4.1924e-059	2.5064e+001	0.0000e+000	2.7106e-003
7.0000e+000	9.0000e+001	1	5.4903e-055	4.2800e-062	2.6058e-048	2.3848e+001	0.0000e+000	2.6117e-003
7.0000e+000	9.5000e+001	1	4.6344e-049	1.3556e-055	7.2585e-043	2.3332e+001	0.0000e+000	2.5419e-003
7.0000e+000	1.0000e+002	1	1.7176e-041	1.3603e-047	1.0490e-035	2.2569e+001	0.0000e+000	2.4953e-003
7.0000e+000	1.0500e+002	1	2.0616e-037	1.0978e-043	3.2408e-031	2.2095e+001	0.0000e+000	2.4310e-003
7.0000e+000	1.1000e+002	1	2.0455e-030	1.6594e-035	3.6921e-025	2.1140e+001	0.0000e+000	2.3637e-003
7.0000e+000	1.1500e+002	1	5.5328e-024	1.6342e-027	1.2139e-020	2.0027e+001	0.0000e+000	2.2408e-003
7.0000e+000	1.2000e+002	1	8.0662e-018	6.9966e-020	2.2183e-015	1.8607e+001	0.0000e+000	2.0897e-003
7.0000e+000	1.2500e+002	1	2.1219e-013	4.9647e-015	9.3500e-012	1.7204e+001	0.0000e+000	2.0174e-003
7.0000e+000	1.3000e+002	1	2.9265e-010	1.5140e-011	4.6395e-009	1.5840e+001	0.0000e+000	1.9135e-003
8.0000e+000	8.0000e+001	1	3.5175e-076	1.6749e-085	1.7371e-063	2.5312e+001	0.0000e+000	2.7865e-003
8.0000e+000	8.5000e+001	1	4.7965e-068	9.5039e-079	1.4323e-055	2.4807e+001	0.0000e+000	2.6836e-003
8.0000e+000	9.0000e+001	1	9.7923e-054	1.2102e-060	4.0923e-047	2.3744e+001	0.0000e+000	2.6128e-003
8.0000e+000	9.5000e+001	1	1.6183e-048	5.4122e-055	2.3095e-042	2.3281e+001	0.0000e+000	2.5495e-003
8.0000e+000	1.0000e+002	1	7.3876e-044	4.0520e-050	1.1300e-037	2.2822e+001	0.0000e+000	2.4828e-003
8.0000e+000	1.0500e+002	1	1.2782e-037	7.9090e-044	1.9892e-031	2.2121e+001	0.0000e+000	2.4108e-003
8.0000e+000	1.1000e+002	1	3.9340e-029	3.1463e-034	6.8977e-024	2.0939e+001	0.0000e+000	2.3365e-003
8.0000e+000	1.1500e+002	1	1.4619e-023	4.9237e-027	3.4293e-020	1.9944e+001	0.0000e+000	2.2211e-003
8.0000e+000	1.2000e+002	1	2.1278e-018	1.3320e-020	9.4093e-016	1.8762e+001	0.0000e+000	2.0818e-003
8.0000e+000	1.2500e+002	1	1.9321e-013	5.2234e-015	1.0843e-011	1.7219e+001	0.0000e+000	1.9444e-003
8.0000e+000	1.3000e+002	1	2.4681e-010	1.3424e-011	3.9392e-009	1.5877e+001	0.0000e+000	1.9246e-003
9.0000e+000	8.0000e+001	1	3.0001e-063	4.7303e-072	3.1252e-054	2.4479e+001	0.0000e+000	2.6708e-003
9.0000e+000	8.5000e+001	1	4.5094e-073	1.0392e-084	1.9218e-061	2.5126e+001	0.0000e+000	2.7794e-003
9.0000e+000	9.0000e+001	1	2.4844e-052	1.6418e-059	1.3461e-045	2.3624e+001	0.0000e+000	2.5630e-003
9.0000e+000	9.5000e+001	1	1.0834e-047	1.9279e-054	2.1237e-041	2.3203e+001	0.0000e+000	2.5308e-003
9.0000e+000	1.0000e+002	1	2.0971e-043	1.0886e-049	2.8558e-037	2.2775e+001	0.0000e+000	2.4754e-003
9.0000e+000	1.0500e+002	1	5.9779e-038	3.1751e-044	1.1899e-031	2.2161e+001	0.0000e+000	2.4342e-003
9.0000e+000	1.1000e+002	1	3.4282e-029	2.8656e-034	6.0269e-024	2.0949e+001	0.0000e+000	2.3427e-003
9.0000e+000	1.1500e+002	1	2.1992e-023	3.7907e-027	1.6553e-019	1.9908e+001	0.0000e+000	2.1430e-003
9.0000e+000	1.2000e+002	1	2.4756e-018	1.1435e-020	1.6823e-015	1.8745e+001	0.0000e+000	2.0663e-003
9.0000e+000	1.2500e+002	1	8.4742e-014	1.5096e-015	5.5492e-012	1.7350e+001	0.0000e+000	1.9675e-003
9.0000e+000	1.3000e+002	1	5.2930e-011	2.0385e-012	1.1394e-009	1.6202e+001	0.0000e+000	1.9136e-003

Tabla 5. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.895100e+001
5.000000e+000	8.500000e+001	1	1.889957e+001
5.000000e+000	9.000000e+001	1	1.883459e+001
5.000000e+000	9.500000e+001	1	1.875758e+001
5.000000e+000	1.000000e+002	1	1.867062e+001
5.000000e+000	1.050000e+002	1	1.856860e+001
5.000000e+000	1.100000e+002	1	1.844073e+001
5.000000e+000	1.150000e+002	1	1.828279e+001
5.000000e+000	1.200000e+002	1	1.808361e+001
5.000000e+000	1.250000e+002	1	1.783084e+001
5.000000e+000	1.300000e+002	1	1.751586e+001
6.000000e+000	8.000000e+001	1	1.895100e+001
6.000000e+000	8.500000e+001	1	1.889957e+001
6.000000e+000	9.000000e+001	1	1.883459e+001
6.000000e+000	9.500000e+001	1	1.875758e+001
6.000000e+000	1.000000e+002	1	1.867062e+001
6.000000e+000	1.050000e+002	1	1.856860e+001
6.000000e+000	1.100000e+002	1	1.844073e+001
6.000000e+000	1.150000e+002	1	1.828279e+001
6.000000e+000	1.200000e+002	1	1.808361e+001
6.000000e+000	1.250000e+002	1	1.783084e+001
6.000000e+000	1.300000e+002	1	1.751586e+001
7.000000e+000	8.000000e+001	1	1.895100e+001
7.000000e+000	8.500000e+001	1	1.889957e+001
7.000000e+000	9.000000e+001	1	1.883459e+001
7.000000e+000	9.500000e+001	1	1.875758e+001
7.000000e+000	1.000000e+002	1	1.867062e+001
7.000000e+000	1.050000e+002	1	1.856860e+001
7.000000e+000	1.100000e+002	1	1.844073e+001
7.000000e+000	1.150000e+002	1	1.828279e+001
7.000000e+000	1.200000e+002	1	1.808361e+001
7.000000e+000	1.250000e+002	1	1.783084e+001
7.000000e+000	1.300000e+002	1	1.751586e+001
8.000000e+000	8.000000e+001	1	1.895100e+001
8.000000e+000	8.500000e+001	1	1.889957e+001
8.000000e+000	9.000000e+001	1	1.883459e+001
8.000000e+000	9.500000e+001	1	1.875758e+001
8.000000e+000	1.000000e+002	1	1.867062e+001
8.000000e+000	1.050000e+002	1	1.856860e+001
8.000000e+000	1.100000e+002	1	1.844073e+001
8.000000e+000	1.150000e+002	1	1.828279e+001
8.000000e+000	1.200000e+002	1	1.808361e+001
8.000000e+000	1.250000e+002	1	1.783084e+001
8.000000e+000	1.300000e+002	1	1.751586e+001
9.000000e+000	8.000000e+001	1	1.895100e+001
9.000000e+000	8.500000e+001	1	1.889957e+001
9.000000e+000	9.000000e+001	1	1.883459e+001
9.000000e+000	9.500000e+001	1	1.875758e+001
9.000000e+000	1.000000e+002	1	1.867062e+001
9.000000e+000	1.050000e+002	1	1.856860e+001
9.000000e+000	1.100000e+002	1	1.844073e+001
9.000000e+000	1.150000e+002	1	1.828279e+001
9.000000e+000	1.200000e+002	1	1.808361e+001
9.000000e+000	1.250000e+002	1	1.783084e+001
9.000000e+000	1.300000e+002	1	1.751586e+001

Tabla 6. Medidas de OSNR. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q*(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	2.6497e-085	2.5818e-097	1.5730e-071	2.5817e+001	0.0000e+000	3.7558e-003
5.0000e+000	8.5000e+001	1	1.5793e-059	4.2645e-067	2.2328e-052	2.4206e+001	0.0000e+000	3.5065e-003
5.0000e+000	9.0000e+001	1	2.6957e-051	2.3601e-058	1.8332e-044	2.3534e+001	0.0000e+000	3.4087e-003
5.0000e+000	9.5000e+001	1	6.2154e-044	5.1156e-051	2.7328e-037	2.2830e+001	0.0000e+000	3.2124e-003
5.0000e+000	1.0000e+002	1	7.2036e-048	1.4853e-054	4.2063e-041	2.3220e+001	0.0000e+000	3.3377e-003
5.0000e+000	1.0500e+002	1	1.1433e-043	5.0890e-052	4.5080e-036	2.2802e+001	0.0000e+000	3.2347e-003
5.0000e+000	1.1000e+002	1	1.6017e-033	2.8047e-039	5.2461e-028	2.1590e+001	0.0000e+000	3.0915e-003
5.0000e+000	1.1500e+002	1	4.1299e-022	3.7961e-025	8.6092e-019	1.9642e+001	0.0000e+000	3.0368e-003
5.0000e+000	1.2000e+002	1	4.8599e-015	7.0920e-017	4.2618e-013	1.7778e+001	0.0000e+000	2.6846e-003
5.0000e+000	1.2500e+002	1	1.3297e-012	4.8529e-014	4.0607e-011	1.6895e+001	0.0000e+000	2.5632e-003
5.0000e+000	1.3000e+002	1	4.3081e-010	2.6259e-011	6.2274e-009	1.5754e+001	0.0000e+000	2.4646e-003
6.0000e+000	8.0000e+001	1	1.8631e-092	9.1214e-105	1.3337e-077	2.6176e+001	0.0000e+000	3.7652e-003
6.0000e+000	8.5000e+001	1	1.2739e-084	4.6425e-097	2.6510e-069	2.5781e+001	0.0000e+000	3.6535e-003
6.0000e+000	9.0000e+001	1	7.4189e-047	1.7494e-053	1.6553e-040	2.3123e+001	0.0000e+000	3.3751e-003
6.0000e+000	9.5000e+001	1	3.0649e-060	1.9829e-068	1.8268e-052	2.4259e+001	0.0000e+000	3.3822e-003
6.0000e+000	1.0000e+002	1	1.1119e-042	2.1567e-049	2.1028e-036	2.2698e+001	0.0000e+000	3.2980e-003
6.0000e+000	1.0500e+002	1	2.7365e-039	2.3175e-046	1.0533e-032	2.2320e+001	0.0000e+000	3.2398e-003
6.0000e+000	1.1000e+002	1	5.7432e-031	3.2791e-036	1.2657e-025	2.1223e+001	0.0000e+000	3.1369e-003
6.0000e+000	1.1500e+002	1	1.1073e-021	1.8885e-024	1.3583e-018	1.9549e+001	0.0000e+000	3.0349e-003
6.0000e+000	1.2000e+002	1	4.8641e-015	7.6930e-017	2.7185e-013	1.7778e+001	0.0000e+000	2.7637e-003
6.0000e+000	1.2500e+002	1	1.5623e-011	5.8241e-013	3.4356e-010	1.6444e+001	0.0000e+000	2.5028e-003
6.0000e+000	1.3000e+002	1	3.4735e-010	2.0302e-011	5.0774e-009	1.5802e+001	0.0000e+000	2.3838e-003
7.0000e+000	8.0000e+001	1	7.4030e-082	5.6546e-091	1.9985e-068	2.5633e+001	0.0000e+000	3.7422e-003
7.0000e+000	8.5000e+001	1	7.8171e-073	2.8324e-083	8.4751e-060	2.5111e+001	0.0000e+000	3.6143e-003
7.0000e+000	9.0000e+001	1	5.6853e-055	3.8228e-062	3.0156e-048	2.3847e+001	0.0000e+000	3.4772e-003
7.0000e+000	9.5000e+001	1	2.2012e-049	5.0963e-056	3.8125e-043	2.3362e+001	0.0000e+000	3.3902e-003
7.0000e+000	1.0000e+002	1	5.9328e-042	4.1058e-048	3.6985e-036	2.2620e+001	0.0000e+000	3.3268e-003
7.0000e+000	1.0500e+002	1	3.1935e-038	1.1183e-044	6.2809e-032	2.2194e+001	0.0000e+000	3.2406e-003
7.0000e+000	1.1000e+002	1	3.9614e-031	1.9776e-036	9.8982e-026	2.1247e+001	0.0000e+000	3.1474e-003
7.0000e+000	1.1500e+002	1	3.7446e-024	1.0283e-027	8.5219e-021	2.0061e+001	0.0000e+000	2.9765e-003
7.0000e+000	1.2000e+002	1	3.7100e-018	2.7743e-020	1.1526e-015	1.8698e+001	0.0000e+000	2.7999e-003
7.0000e+000	1.2500e+002	1	1.1214e-013	2.5471e-015	5.3083e-012	1.7306e+001	0.0000e+000	2.6985e-003
7.0000e+000	1.3000e+002	1	1.7348e-010	8.5829e-012	2.8790e-009	1.5954e+001	0.0000e+000	2.5663e-003
8.0000e+000	8.0000e+001	1	1.9270e-077	6.1402e-087	1.7076e-064	2.5386e+001	0.0000e+000	3.7144e-003
8.0000e+000	8.5000e+001	1	9.2256e-069	1.2972e-079	3.1932e-056	2.4854e+001	0.0000e+000	3.5784e-003
8.0000e+000	9.0000e+001	1	1.1595e-053	1.2517e-060	5.0883e-047	2.3738e+001	0.0000e+000	3.4804e-003
8.0000e+000	9.5000e+001	1	1.1251e-048	3.2416e-055	1.6477e-042	2.3296e+001	0.0000e+000	3.3995e-003
8.0000e+000	1.0000e+002	1	3.1155e-044	1.4584e-050	4.3050e-038	2.2861e+001	0.0000e+000	3.3109e-003
8.0000e+000	1.0500e+002	1	1.8310e-038	7.2727e-045	3.5592e-032	2.2222e+001	0.0000e+000	3.2138e-003
8.0000e+000	1.1000e+002	1	5.8897e-030	2.9914e-035	1.4027e-024	2.1069e+001	0.0000e+000	3.1196e-003
8.0000e+000	1.1500e+002	1	1.0751e-023	3.4362e-027	2.5447e-020	1.9970e+001	0.0000e+000	2.9566e-003
8.0000e+000	1.2000e+002	1	1.0097e-018	5.6121e-021	4.9544e-016	1.8846e+001	0.0000e+000	2.7897e-003
8.0000e+000	1.2500e+002	1	9.9563e-014	2.6263e-015	6.1612e-012	1.7325e+001	0.0000e+000	2.6037e-003
8.0000e+000	1.3000e+002	1	1.4487e-010	7.6280e-012	2.4417e-009	1.5993e+001	0.0000e+000	2.5760e-003
9.0000e+000	8.0000e+001	1	6.8182e-075	7.5433e-085	2.2513e-062	2.5236e+001	0.0000e+000	3.6863e-003
9.0000e+000	8.5000e+001	1	6.0219e-074	9.0166e-086	3.1466e-062	2.5179e+001	0.0000e+000	3.7070e-003
9.0000e+000	9.0000e+001	1	3.1629e-052	1.9465e-059	1.7400e-045	2.3615e+001	0.0000e+000	3.4133e-003
9.0000e+000	9.5000e+001	1	7.9834e-048	1.3014e-054	1.6904e-041	2.3216e+001	0.0000e+000	3.3739e-003
9.0000e+000	1.0000e+002	1	9.4470e-044	4.1920e-050	1.1666e-037	2.2811e+001	0.0000e+000	3.3006e-003

Tabla 7. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Numero de taps	smf_length km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.894026e+001
5.000000e+000	8.500000e+001	1	1.889669e+001
5.000000e+000	9.000000e+001	1	1.884188e+001
5.000000e+000	9.500000e+001	1	1.877801e+001
5.000000e+000	1.000000e+002	1	1.870816e+001
5.000000e+000	1.050000e+002	1	1.862830e+001
5.000000e+000	1.100000e+002	1	1.852877e+001
5.000000e+000	1.150000e+002	1	1.840670e+001
5.000000e+000	1.200000e+002	1	1.825208e+001
5.000000e+000	1.250000e+002	1	1.805347e+001
5.000000e+000	1.300000e+002	1	1.780279e+001
6.000000e+000	8.000000e+001	1	1.894026e+001
6.000000e+000	8.500000e+001	1	1.889669e+001
6.000000e+000	9.000000e+001	1	1.884188e+001
6.000000e+000	9.500000e+001	1	1.877801e+001
6.000000e+000	1.000000e+002	1	1.870816e+001
6.000000e+000	1.050000e+002	1	1.862830e+001
6.000000e+000	1.100000e+002	1	1.852877e+001
6.000000e+000	1.150000e+002	1	1.840670e+001
6.000000e+000	1.200000e+002	1	1.825208e+001
6.000000e+000	1.250000e+002	1	1.805347e+001
6.000000e+000	1.300000e+002	1	1.780279e+001
7.000000e+000	8.000000e+001	1	1.894026e+001
7.000000e+000	8.500000e+001	1	1.889669e+001
7.000000e+000	9.000000e+001	1	1.884188e+001
7.000000e+000	9.500000e+001	1	1.877801e+001
7.000000e+000	1.000000e+002	1	1.870816e+001
7.000000e+000	1.050000e+002	1	1.862830e+001
7.000000e+000	1.100000e+002	1	1.852877e+001
7.000000e+000	1.150000e+002	1	1.840670e+001
7.000000e+000	1.200000e+002	1	1.825208e+001
7.000000e+000	1.250000e+002	1	1.805347e+001
7.000000e+000	1.300000e+002	1	1.780279e+001
8.000000e+000	8.000000e+001	1	1.894026e+001
8.000000e+000	8.500000e+001	1	1.889669e+001
8.000000e+000	9.000000e+001	1	1.884188e+001
8.000000e+000	9.500000e+001	1	1.877801e+001
8.000000e+000	1.000000e+002	1	1.870816e+001
8.000000e+000	1.050000e+002	1	1.862830e+001
8.000000e+000	1.100000e+002	1	1.852877e+001
8.000000e+000	1.150000e+002	1	1.840670e+001
8.000000e+000	1.200000e+002	1	1.825208e+001
8.000000e+000	1.250000e+002	1	1.805347e+001
8.000000e+000	1.300000e+002	1	1.780279e+001
9.000000e+000	8.000000e+001	1	1.894026e+001
9.000000e+000	8.500000e+001	1	1.889669e+001
9.000000e+000	9.000000e+001	1	1.884188e+001
9.000000e+000	9.500000e+001	1	1.877801e+001
9.000000e+000	1.000000e+002	1	1.870816e+001
9.000000e+000	1.050000e+002	1	1.862830e+001
9.000000e+000	1.100000e+002	1	1.852877e+001
9.000000e+000	1.150000e+002	1	1.840670e+001
9.000000e+000	1.200000e+002	1	1.825208e+001
9.000000e+000	1.250000e+002	1	1.805347e+001
9.000000e+000	1.300000e+002	1	1.780279e+001

Tabla 8. Medidas de OSNR. Configuración 5 mono canal, con un equalizador DFE en el lugar del receptor y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Anexo Y: Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato de modulación NRZ-DPSK.

Numero	taps	smf	length	km	RUN#	BER	BER lo	BER hi	Q ² (dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	2.3452e-066	8.3342e-076	1.9499e-056	2.4694e+001	0.0000e+000	8.2922e-004			
5.0000e+000	8.5000e+001	1	2.8576e-070	3.9438e-080	7.2255e-058	2.4951e+001	0.0000e+000	8.5252e-004			
5.0000e+000	9.0000e+001	1	1.3199e-052	1.3334e-059	7.6764e-046	2.3648e+001	0.0000e+000	8.0634e-004			
5.0000e+000	9.5000e+001	1	1.5691e-048	1.0321e-055	8.1218e-042	2.3283e+001	0.0000e+000	8.0635e-004			
5.0000e+000	1.0000e+002	1	3.5347e-045	2.5738e-051	5.1976e-038	2.2957e+001	0.0000e+000	7.9832e-004			
5.0000e+000	1.0500e+002	1	5.9595e-034	8.3434e-039	2.7909e-028	2.1649e+001	0.0000e+000	7.5600e-004			
5.0000e+000	1.1000e+002	1	3.6781e-028	5.9067e-033	3.6083e-023	2.0781e+001	0.0000e+000	7.8210e-004			
5.0000e+000	1.1500e+002	1	3.2530e-023	5.5728e-027	2.3588e-019	1.9873e+001	0.0000e+000	7.0218e-004			
5.0000e+000	1.2000e+002	1	2.9068e-017	1.7628e-019	1.2782e-014	1.8453e+001	0.0000e+000	6.7603e-004			
5.0000e+000	1.2500e+002	1	6.6137e-013	1.2899e-014	3.7581e-011	1.7015e+001	0.0000e+000	6.2503e-004			
5.0000e+000	1.3000e+002	1	4.6431e-010	1.9315e-011	9.0383e-009	1.5737e+001	0.0000e+000	5.7894e-004			
6.0000e+000	8.0000e+001	1	2.8487e-061	2.1672e-069	3.8966e-051	2.4336e+001	0.0000e+000	8.1656e-004			
6.0000e+000	8.5000e+001	1	1.5898e-067	1.1905e-077	1.5169e-055	2.4772e+001	0.0000e+000	8.5666e-004			
6.0000e+000	9.0000e+001	1	5.6660e-047	5.7207e-053	3.2397e-041	2.3134e+001	0.0000e+000	8.1269e-004			
6.0000e+000	9.5000e+001	1	2.6018e-043	2.6193e-049	1.1810e-037	2.2765e+001	0.0000e+000	8.0963e-004			
6.0000e+000	1.0000e+002	1	1.9427e-036	1.0109e-041	3.4522e-031	2.1974e+001	0.0000e+000	8.0928e-004			
6.0000e+000	1.0500e+002	1	6.1401e-037	5.7221e-043	1.0631e-030	2.2037e+001	0.0000e+000	7.8363e-004			
6.0000e+000	1.1000e+002	1	8.7681e-029	1.5260e-033	6.5246e-024	2.0883e+001	0.0000e+000	7.7359e-004			
6.0000e+000	1.1500e+002	1	1.9997e-023	3.3183e-027	1.4968e-019	1.9916e+001	0.0000e+000	6.9902e-004			
6.0000e+000	1.2000e+002	1	7.9999e-018	4.5298e-020	4.5022e-015	1.8608e+001	0.0000e+000	7.0130e-004			
6.0000e+000	1.2500e+002	1	1.5335e-013	3.4687e-015	6.4910e-012	1.7256e+001	0.0000e+000	6.6943e-004			
6.0000e+000	1.3000e+002	1	1.1213e-010	5.8364e-012	1.8171e-009	1.6047e+001	0.0000e+000	6.5327e-004			
7.0000e+000	8.0000e+001	1	7.2775e-055	2.7627e-062	3.0245e-046	2.3838e+001	0.0000e+000	8.1799e-004			
7.0000e+000	8.5000e+001	1	3.7447e-064	8.2803e-074	1.5610e-052	2.4542e+001	0.0000e+000	8.2102e-004			
7.0000e+000	9.0000e+001	1	5.0907e-055	5.5059e-063	1.3239e-047	2.3851e+001	0.0000e+000	8.5414e-004			
7.0000e+000	9.5000e+001	1	1.1917e-047	2.6798e-054	2.2035e-041	2.3199e+001	0.0000e+000	8.0472e-004			
7.0000e+000	1.0000e+002	1	5.8082e-045	9.1396e-052	1.8763e-038	2.2936e+001	0.0000e+000	8.1220e-004			
7.0000e+000	1.0500e+002	1	2.3129e-036	1.6232e-042	2.3832e-030	2.1965e+001	0.0000e+000	7.9200e-004			
7.0000e+000	1.1000e+002	1	2.0522e-028	6.2841e-033	1.7149e-023	2.0823e+001	0.0000e+000	7.7366e-004			
7.0000e+000	1.1500e+002	1	2.3995e-023	4.7396e-027	1.4539e-019	1.9900e+001	0.0000e+000	7.4509e-004			
7.0000e+000	1.2000e+002	1	1.1631e-017	5.2175e-020	9.2991e-015	1.8564e+001	0.0000e+000	7.1056e-004			
7.0000e+000	1.2500e+002	1	1.3788e-012	2.9181e-014	7.5611e-011	1.6889e+001	0.0000e+000	6.8028e-004			
7.0000e+000	1.3000e+002	1	1.2059e-009	5.2899e-011	2.3984e-008	1.5516e+001	0.0000e+000	6.5895e-004			
8.0000e+000	8.0000e+001	1	3.5473e-054	1.6168e-061	2.1297e-045	2.3781e+001	0.0000e+000	8.1082e-004			
8.0000e+000	8.5000e+001	1	1.9800e-065	1.2868e-075	2.2832e-053	2.4631e+001	0.0000e+000	8.2693e-004			
8.0000e+000	9.0000e+001	1	1.5145e-055	1.6677e-063	4.1282e-048	2.3894e+001	0.0000e+000	8.5988e-004			
8.0000e+000	9.5000e+001	1	1.2089e-047	2.9215e-054	3.1769e-041	2.3199e+001	0.0000e+000	8.1195e-004			
8.0000e+000	1.0000e+002	1	6.2827e-042	9.7474e-048	4.6213e-036	2.2617e+001	0.0000e+000	8.1261e-004			
8.0000e+000	1.0500e+002	1	4.3365e-036	5.8513e-042	1.7185e-030	2.1930e+001	0.0000e+000	7.9041e-004			
8.0000e+000	1.1000e+002	1	1.3675e-027	3.0372e-032	9.8532e-023	2.0685e+001	0.0000e+000	7.5265e-004			
8.0000e+000	1.1500e+002	1	1.0034e-022	2.3534e-026	4.7241e-019	1.9772e+001	0.0000e+000	7.4284e-004			
8.0000e+000	1.2000e+002	1	7.0169e-018	3.2377e-020	5.1959e-015	1.8624e+001	0.0000e+000	7.1066e-004			
8.0000e+000	1.2500e+002	1	9.3644e-013	1.9947e-014	5.0390e-011	1.6956e+001	0.0000e+000	6.7892e-004			
8.0000e+000	1.3000e+002	1	6.6548e-010	3.3836e-011	1.1804e-008	1.5655e+001	0.0000e+000	6.7172e-004			
9.0000e+000	8.0000e+001	1	4.2472e-053	1.2775e-060	8.8510e-044	2.3690e+001	0.0000e+000	7.9495e-004			
9.0000e+000	8.5000e+001	1	4.8063e-064	8.2636e-074	1.7083e-052	2.4535e+001	0.0000e+000	8.3305e-004			
9.0000e+000	9.0000e+001	1	3.8359e-053	8.9332e-061	5.0186e-046	2.3694e+001	0.0000e+000	8.5252e-004			
9.0000e+000	9.5000e+001	1	8.7731e-046	3.9309e-052	8.1199e-040	2.3018e+001	0.0000e+000	8.0299e-004			
9.0000e+000	1.0000e+002	1	5.7310e-042	8.9092e-048	4.2678e-036	2.2621e+001	0.0000e+000	8.1333e-004			
9.0000e+000	1.0500e+002	1	3.4477e-036	4.8337e-042	1.3179e-030	2.1943e+001	0.0000e+000	7.9125e-004			
9.0000e+000	1.1000e+002	1	3.1611e-028	4.7397e-033	4.1797e-023	2.0792e+001	0.0000e+000	7.7788e-004			
9.0000e+000	1.1500e+002	1	9.2725e-025	1.0799e-028	1.0739e-020	2.0178e+001	0.0000e+000	7.2962e-004			
9.0000e+000	1.2000e+002	1	2.6571e-018	1.0889e-020	2.1174e-015	1.8737e+001	0.0000e+000	7.1734e-004			
9.0000e+000	1.2500e+002	1	1.5277e-013	2.2183e-015	1.3075e-011	1.7257e+001	0.0000e+000	6.6841e-004			
9.0000e+000	1.3000e+002	1	1.0991e-010	3.9942e-012	2.4188e-009	1.6051e+001	0.0000e+000	6.5700e-004			

Tabla 1. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.883170e+001
5.000000e+000	8.500000e+001	1	1.872133e+001
5.000000e+000	9.000000e+001	1	1.858098e+001
5.000000e+000	9.500000e+001	1	1.840819e+001
5.000000e+000	1.000000e+002	1	1.820006e+001
5.000000e+000	1.050000e+002	1	1.794673e+001
5.000000e+000	1.100000e+002	1	1.763406e+001
5.000000e+000	1.150000e+002	1	1.725468e+001
5.000000e+000	1.200000e+002	1	1.679752e+001
5.000000e+000	1.250000e+002	1	1.625390e+001
5.000000e+000	1.300000e+002	1	1.562147e+001
6.000000e+000	8.000000e+001	1	1.883170e+001
6.000000e+000	8.500000e+001	1	1.872133e+001
6.000000e+000	9.000000e+001	1	1.858098e+001
6.000000e+000	9.500000e+001	1	1.840819e+001
6.000000e+000	1.000000e+002	1	1.820006e+001
6.000000e+000	1.050000e+002	1	1.794673e+001
6.000000e+000	1.100000e+002	1	1.763406e+001
6.000000e+000	1.150000e+002	1	1.725468e+001
6.000000e+000	1.200000e+002	1	1.679752e+001
6.000000e+000	1.250000e+002	1	1.625390e+001
6.000000e+000	1.300000e+002	1	1.562147e+001
7.000000e+000	8.000000e+001	1	1.883170e+001
7.000000e+000	8.500000e+001	1	1.872133e+001
7.000000e+000	9.000000e+001	1	1.858098e+001
7.000000e+000	9.500000e+001	1	1.840819e+001
7.000000e+000	1.000000e+002	1	1.820006e+001
7.000000e+000	1.050000e+002	1	1.794673e+001
7.000000e+000	1.100000e+002	1	1.763406e+001
7.000000e+000	1.150000e+002	1	1.725468e+001
7.000000e+000	1.200000e+002	1	1.679752e+001
7.000000e+000	1.250000e+002	1	1.625390e+001
7.000000e+000	1.300000e+002	1	1.562147e+001
8.000000e+000	8.000000e+001	1	1.883170e+001
8.000000e+000	8.500000e+001	1	1.872133e+001
8.000000e+000	9.000000e+001	1	1.858098e+001
8.000000e+000	9.500000e+001	1	1.840819e+001
8.000000e+000	1.000000e+002	1	1.820006e+001
8.000000e+000	1.050000e+002	1	1.794673e+001
8.000000e+000	1.100000e+002	1	1.763406e+001
8.000000e+000	1.150000e+002	1	1.725468e+001
8.000000e+000	1.200000e+002	1	1.679752e+001
8.000000e+000	1.250000e+002	1	1.625390e+001
8.000000e+000	1.300000e+002	1	1.562147e+001
9.000000e+000	8.000000e+001	1	1.883170e+001
9.000000e+000	8.500000e+001	1	1.872133e+001
9.000000e+000	9.000000e+001	1	1.858098e+001
9.000000e+000	9.500000e+001	1	1.840819e+001
9.000000e+000	1.000000e+002	1	1.820006e+001
9.000000e+000	1.050000e+002	1	1.794673e+001
9.000000e+000	1.100000e+002	1	1.763406e+001
9.000000e+000	1.150000e+002	1	1.725468e+001
9.000000e+000	1.200000e+002	1	1.679752e+001
9.000000e+000	1.250000e+002	1	1.625390e+001
9.000000e+000	1.300000e+002	1	1.562147e+001

Tabla 2. Medidas de OSNR. Configuración 5 mono canal, con equalizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 1 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	2.8359e-069	1.3594e-078	3.9603e-058	2.4887e+001	0.0000e+000	1.6630e-003
5.0000e+000	8.5000e+001	1	2.9139e-071	3.2561e-081	1.1092e-058	2.5014e+001	0.0000e+000	1.7052e-003
5.0000e+000	9.0000e+001	1	7.6856e-053	6.9438e-060	5.8065e-046	2.3668e+001	0.0000e+000	1.6112e-003
5.0000e+000	9.5000e+001	1	7.7086e-049	4.1166e-056	4.4269e-042	2.3311e+001	0.0000e+000	1.6110e-003
5.0000e+000	1.0000e+002	1	3.1956e-046	1.5833e-052	5.9975e-039	2.3061e+001	0.0000e+000	1.6007e-003
5.0000e+000	1.0500e+002	1	3.6055e-035	2.9986e-040	3.0239e-029	2.1811e+001	0.0000e+000	1.5130e-003
5.0000e+000	1.1000e+002	1	5.8138e-029	6.1612e-034	8.5547e-024	2.0912e+001	0.0000e+000	1.5628e-003
5.0000e+000	1.1500e+002	1	1.9883e-023	3.2300e-027	1.5961e-019	1.9917e+001	0.0000e+000	1.4065e-003
5.0000e+000	1.2000e+002	1	1.2533e-017	6.8303e-020	6.3540e-015	1.8555e+001	0.0000e+000	1.3582e-003
5.0000e+000	1.2500e+002	1	3.2829e-013	6.1619e-015	2.0426e-011	1.7132e+001	0.0000e+000	1.2556e-003
5.0000e+000	1.3000e+002	1	2.6102e-010	1.0279e-011	5.4199e-009	1.5865e+001	0.0000e+000	1.1657e-003
6.0000e+000	8.0000e+001	1	1.5341e-060	1.7531e-068	1.4187e-050	2.4282e+001	0.0000e+000	1.6317e-003
6.0000e+000	8.5000e+001	1	1.5225e-065	6.7399e-075	5.6998e-054	2.4639e+001	0.0000e+000	1.6260e-003
6.0000e+000	9.0000e+001	1	4.4298e-047	3.9646e-053	2.6192e-041	2.3145e+001	0.0000e+000	1.6231e-003
6.0000e+000	9.5000e+001	1	1.5540e-043	1.3597e-049	7.1540e-038	2.2789e+001	0.0000e+000	1.6173e-003
6.0000e+000	1.0000e+002	1	6.2841e-037	2.6752e-042	1.1958e-031	2.2036e+001	0.0000e+000	1.6182e-003
6.0000e+000	1.0500e+002	1	3.8599e-038	1.9050e-044	1.1609e-031	2.2184e+001	0.0000e+000	1.5671e-003
6.0000e+000	1.1000e+002	1	4.5006e-029	8.2839e-034	5.8050e-024	2.0930e+001	0.0000e+000	1.5442e-003
6.0000e+000	1.1500e+002	1	1.1744e-023	1.8490e-027	9.7933e-020	1.9963e+001	0.0000e+000	1.4001e-003
6.0000e+000	1.2000e+002	1	3.2373e-018	1.6096e-020	2.1281e-015	1.8714e+001	0.0000e+000	1.4080e-003
6.0000e+000	1.2500e+002	1	7.1390e-014	1.5207e-015	3.2506e-012	1.7377e+001	0.0000e+000	1.3433e-003
6.0000e+000	1.3000e+002	1	5.8362e-011	2.8906e-012	9.9859e-010	1.6182e+001	0.0000e+000	1.3126e-003
7.0000e+000	8.0000e+001	1	1.7024e-073	1.2683e-082	1.0694e-061	2.5152e+001	0.0000e+000	1.6802e-003
7.0000e+000	8.5000e+001	1	4.9820e-065	8.0192e-075	2.9607e-053	2.4603e+001	0.0000e+000	1.6410e-003
7.0000e+000	9.0000e+001	1	3.2470e-055	2.8378e-063	1.0927e-047	2.3867e+001	0.0000e+000	1.7026e-003
7.0000e+000	9.5000e+001	1	3.0414e-048	5.1273e-055	6.3326e-042	2.3256e+001	0.0000e+000	1.6088e-003
7.0000e+000	1.0000e+002	1	8.8394e-046	8.8470e-053	3.7932e-039	2.3017e+001	0.0000e+000	1.6240e-003
7.0000e+000	1.0500e+002	1	2.2844e-037	8.8181e-044	3.7043e-031	2.2090e+001	0.0000e+000	1.5832e-003
7.0000e+000	1.1000e+002	1	1.1785e-029	1.2612e-034	1.3100e-024	2.1022e+001	0.0000e+000	1.5445e-003
7.0000e+000	1.1500e+002	1	1.4499e-023	2.7199e-027	8.9039e-020	1.9944e+001	0.0000e+000	1.4902e-003
7.0000e+000	1.2000e+002	1	4.2070e-018	1.6682e-020	3.9914e-015	1.8684e+001	0.0000e+000	1.4276e-003
7.0000e+000	1.2500e+002	1	6.8321e-013	1.3774e-014	4.0705e-011	1.7010e+001	0.0000e+000	1.3648e-003
7.0000e+000	1.3000e+002	1	6.8417e-010	2.8456e-011	1.4591e-008	1.5648e+001	0.0000e+000	1.3266e-003
8.0000e+000	8.0000e+001	1	4.9369e-075	1.5165e-084	9.0644e-063	2.5244e+001	0.0000e+000	1.6896e-003
8.0000e+000	8.5000e+001	1	2.4195e-066	1.0686e-076	3.9980e-054	2.4693e+001	0.0000e+000	1.6528e-003
8.0000e+000	9.0000e+001	1	8.8024e-056	7.7833e-064	2.7514e-048	2.3913e+001	0.0000e+000	1.7218e-003
8.0000e+000	9.5000e+001	1	3.2353e-048	5.4944e-055	8.5726e-042	2.3253e+001	0.0000e+000	1.6213e-003
8.0000e+000	1.0000e+002	1	1.2613e-042	1.4469e-048	1.0402e-036	2.2692e+001	0.0000e+000	1.6229e-003
8.0000e+000	1.0500e+002	1	4.5598e-037	3.7541e-043	2.7180e-031	2.2053e+001	0.0000e+000	1.5794e-003
8.0000e+000	1.1000e+002	1	5.2602e-030	4.3411e-035	9.2529e-025	2.1076e+001	0.0000e+000	1.5674e-003
8.0000e+000	1.1500e+002	1	6.6963e-023	1.5042e-026	3.1422e-019	1.9809e+001	0.0000e+000	1.4856e-003
8.0000e+000	1.2000e+002	1	8.2556e-018	3.8221e-020	4.3654e-015	1.8605e+001	0.0000e+000	1.4171e-003
8.0000e+000	1.2500e+002	1	4.5953e-013	9.2990e-015	2.6865e-011	1.7077e+001	0.0000e+000	1.3620e-003
8.0000e+000	1.3000e+002	1	3.5652e-010	1.7094e-011	6.8148e-009	1.5796e+001	0.0000e+000	1.3520e-003
9.0000e+000	8.0000e+001	1	1.8069e-052	7.3160e-060	2.6419e-043	2.3636e+001	0.0000e+000	1.5886e-003
9.0000e+000	8.5000e+001	1	6.5469e-065	7.7115e-075	3.2025e-053	2.4595e+001	0.0000e+000	1.6652e-003
9.0000e+000	9.0000e+001	1	2.2862e-053	4.4973e-061	3.3943e-046	2.3713e+001	0.0000e+000	1.7000e-003
9.0000e+000	9.5000e+001	1	2.3928e-046	8.6483e-053	2.4468e-040	2.3074e+001	0.0000e+000	1.6104e-003
9.0000e+000	1.0000e+002	1	2.9558e-043	3.0993e-049	3.3469e-037	2.2759e+001	0.0000e+000	1.6278e-003
9.0000e+000	1.0500e+002	1	3.4928e-037	2.9750e-043	2.0135e-031	2.2067e+001	0.0000e+000	1.5812e-003
9.0000e+000	1.1000e+002	1	4.8217e-029	4.6374e-034	9.4195e-024	2.0925e+001	0.0000e+000	1.5556e-003
9.0000e+000	1.1500e+002	1	8.3527e-026	5.9369e-030	1.8094e-021	2.0372e+001	0.0000e+000	1.4590e-003
9.0000e+000	1.2000e+002	1	9.2167e-019	3.2925e-021	8.8065e-016	1.8857e+001	0.0000e+000	1.4411e-003
9.0000e+000	1.2500e+002	1	7.2426e-014	1.0069e-015	6.9066e-012	1.7375e+001	0.0000e+000	1.3421e-003
9.0000e+000	1.3000e+002	1	5.9053e-011	2.0194e-012	1.3901e-009	1.6180e+001	0.0000e+000	1.3215e-003

Tabla 3. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.893777e+001
5.000000e+000	8.500000e+001	1	1.887100e+001
5.000000e+000	9.000000e+001	1	1.878622e+001
5.000000e+000	9.500000e+001	1	1.868372e+001
5.000000e+000	1.000000e+002	1	1.856394e+001
5.000000e+000	1.050000e+002	1	1.841996e+001
5.000000e+000	1.100000e+002	1	1.823938e+001
5.000000e+000	1.150000e+002	1	1.801614e+001
5.000000e+000	1.200000e+002	1	1.773789e+001
5.000000e+000	1.250000e+002	1	1.739200e+001
5.000000e+000	1.300000e+002	1	1.697048e+001
6.000000e+000	8.000000e+001	1	1.893777e+001
6.000000e+000	8.500000e+001	1	1.887100e+001
6.000000e+000	9.000000e+001	1	1.878622e+001
6.000000e+000	9.500000e+001	1	1.868372e+001
6.000000e+000	1.000000e+002	1	1.856394e+001
6.000000e+000	1.050000e+002	1	1.841996e+001
6.000000e+000	1.100000e+002	1	1.823938e+001
6.000000e+000	1.150000e+002	1	1.801614e+001
6.000000e+000	1.200000e+002	1	1.773789e+001
6.000000e+000	1.250000e+002	1	1.739200e+001
6.000000e+000	1.300000e+002	1	1.697048e+001
7.000000e+000	8.000000e+001	1	1.893777e+001
7.000000e+000	8.500000e+001	1	1.887100e+001
7.000000e+000	9.000000e+001	1	1.878622e+001
7.000000e+000	9.500000e+001	1	1.868372e+001
7.000000e+000	1.000000e+002	1	1.856394e+001
7.000000e+000	1.050000e+002	1	1.841996e+001
7.000000e+000	1.100000e+002	1	1.823938e+001
7.000000e+000	1.150000e+002	1	1.801614e+001
7.000000e+000	1.200000e+002	1	1.773789e+001
7.000000e+000	1.250000e+002	1	1.739200e+001
7.000000e+000	1.300000e+002	1	1.697048e+001
8.000000e+000	8.000000e+001	1	1.893777e+001
8.000000e+000	8.500000e+001	1	1.887100e+001
8.000000e+000	9.000000e+001	1	1.878622e+001
8.000000e+000	9.500000e+001	1	1.868372e+001
8.000000e+000	1.000000e+002	1	1.856394e+001
8.000000e+000	1.050000e+002	1	1.841996e+001
8.000000e+000	1.100000e+002	1	1.823938e+001
8.000000e+000	1.150000e+002	1	1.801614e+001
8.000000e+000	1.200000e+002	1	1.773789e+001
8.000000e+000	1.250000e+002	1	1.739200e+001
8.000000e+000	1.300000e+002	1	1.697048e+001
9.000000e+000	8.000000e+001	1	1.893777e+001
9.000000e+000	8.500000e+001	1	1.887100e+001
9.000000e+000	9.000000e+001	1	1.878622e+001
9.000000e+000	9.500000e+001	1	1.868372e+001
9.000000e+000	1.000000e+002	1	1.856394e+001
9.000000e+000	1.050000e+002	1	1.841996e+001
9.000000e+000	1.100000e+002	1	1.823938e+001
9.000000e+000	1.150000e+002	1	1.801614e+001
9.000000e+000	1.200000e+002	1	1.773789e+001
9.000000e+000	1.250000e+002	1	1.739200e+001
9.000000e+000	1.300000e+002	1	1.697048e+001

Tabla 4. Medidas de OSNR. Configuración 5 mono canal, con equalizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 2 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q^2(dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	9.7204e-071	2.5812e-080	2.9331e-059	2.4981e+001	0.0000e+000	2.4952e-003
5.0000e+000	8.5000e+001	1	4.5764e-072	3.8476e-082	2.1815e-059	2.5064e+001	0.0000e+000	2.5561e-003
5.0000e+000	9.0000e+001	1	6.7402e-053	5.8963e-060	6.0859e-046	2.3673e+001	0.0000e+000	2.4145e-003
5.0000e+000	9.5000e+001	1	5.9095e-049	2.8024e-056	3.7247e-042	2.3322e+001	0.0000e+000	2.4037e-003
5.0000e+000	1.0000e+002	1	4.2921e-047	1.4672e-053	9.4363e-040	2.3146e+001	0.0000e+000	2.4061e-003
5.0000e+000	1.0500e+002	1	2.4326e-036	1.2013e-041	3.3355e-030	2.1962e+001	0.0000e+000	2.2709e-003
5.0000e+000	1.1000e+002	1	9.7617e-030	6.8383e-035	2.0053e-024	2.1035e+001	0.0000e+000	2.3429e-003
5.0000e+000	1.1500e+002	1	1.4224e-023	2.2846e-027	1.2021e-019	1.9946e+001	0.0000e+000	2.1130e-003
5.0000e+000	1.2000e+002	1	5.7794e-018	2.8190e-020	3.3110e-015	1.8647e+001	0.0000e+000	2.0464e-003
5.0000e+000	1.2500e+002	1	1.6941e-013	3.0850e-015	1.1445e-011	1.7240e+001	0.0000e+000	1.8903e-003
5.0000e+000	1.3000e+002	1	1.4963e-010	5.6144e-012	3.3021e-009	1.5986e+001	0.0000e+000	1.7605e-003
6.0000e+000	8.0000e+001	1	1.1542e-059	2.0269e-067	6.6906e-050	2.4216e+001	0.0000e+000	2.4447e-003
6.0000e+000	8.5000e+001	1	2.5941e-066	7.7796e-076	1.2619e-054	2.4691e+001	0.0000e+000	2.4376e-003
6.0000e+000	9.0000e+001	1	4.5880e-047	3.8892e-053	2.6707e-041	2.3143e+001	0.0000e+000	2.4315e-003
6.0000e+000	9.5000e+001	1	1.3419e-043	1.1250e-049	6.2186e-038	2.2795e+001	0.0000e+000	2.4227e-003
6.0000e+000	1.0000e+002	1	2.4289e-037	8.8549e-043	4.6257e-032	2.2087e+001	0.0000e+000	2.4266e-003
6.0000e+000	1.0500e+002	1	2.8151e-039	7.4052e-046	1.3207e-032	2.2318e+001	0.0000e+000	2.3501e-003
6.0000e+000	1.1000e+002	1	2.8736e-030	1.8154e-035	4.5601e-025	2.1117e+001	0.0000e+000	2.3124e-003
6.0000e+000	1.1500e+002	1	8.0693e-024	1.2559e-027	7.1136e-020	1.9995e+001	0.0000e+000	2.1035e-003
6.0000e+000	1.2000e+002	1	1.4065e-018	6.1166e-021	1.0572e-015	1.8809e+001	0.0000e+000	2.1199e-003
6.0000e+000	1.2500e+002	1	3.4628e-014	6.9880e-016	1.6826e-012	1.7489e+001	0.0000e+000	2.0220e-003
6.0000e+000	1.3000e+002	1	3.2667e-011	1.5343e-012	5.9051e-010	1.6300e+001	0.0000e+000	1.9749e-003
7.0000e+000	8.0000e+001	1	8.8813e-075	4.4588e-084	1.0044e-062	2.5229e+001	0.0000e+000	2.5178e-003
7.0000e+000	8.5000e+001	1	9.3878e-066	1.0265e-075	6.9106e-054	2.4653e+001	0.0000e+000	2.4595e-003
7.0000e+000	9.0000e+001	1	3.1167e-055	2.4664e-063	1.2465e-047	2.3868e+001	0.0000e+000	2.5433e-003
7.0000e+000	9.5000e+001	1	9.9847e-049	1.4950e-055	2.3925e-042	2.3301e+001	0.0000e+000	2.4121e-003
7.0000e+000	1.0000e+002	1	1.8713e-046	1.2607e-053	9.5368e-040	2.3084e+001	0.0000e+000	2.4315e-003
7.0000e+000	1.0500e+002	1	2.5275e-038	5.5249e-045	5.8373e-032	2.2206e+001	0.0000e+000	2.3729e-003
7.0000e+000	1.1000e+002	1	1.9966e-030	1.2819e-035	3.1513e-025	2.1141e+001	0.0000e+000	2.3129e-003
7.0000e+000	1.1500e+002	1	1.0264e-023	1.8969e-027	6.1053e-020	1.9974e+001	0.0000e+000	2.2357e-003
7.0000e+000	1.2000e+002	1	1.6301e-018	5.7031e-021	1.7887e-015	1.8792e+001	0.0000e+000	2.1509e-003
7.0000e+000	1.2500e+002	1	3.5030e-013	6.7663e-015	2.2423e-011	1.7122e+001	0.0000e+000	2.0537e-003
7.0000e+000	1.3000e+002	1	2.8411e-010	1.1399e-011	6.4361e-009	1.5846e+001	0.0000e+000	1.9809e-003
8.0000e+000	8.0000e+001	1	2.3708e-076	4.9677e-086	7.9120e-064	2.5322e+001	0.0000e+000	2.5316e-003
8.0000e+000	8.5000e+001	1	4.1467e-067	1.1972e-077	8.4987e-055	2.4744e+001	0.0000e+000	2.4770e-003
8.0000e+000	9.0000e+001	1	7.3897e-056	6.0650e-064	2.5447e-048	2.3919e+001	0.0000e+000	2.5749e-003
8.0000e+000	9.5000e+001	1	1.0850e-048	1.4676e-055	2.8887e-042	2.3298e+001	0.0000e+000	2.4281e-003
8.0000e+000	1.0000e+002	1	3.3137e-043	2.9501e-049	2.7657e-037	2.2754e+001	0.0000e+000	2.4305e-003
8.0000e+000	1.0500e+002	1	5.4563e-038	2.8482e-044	4.4587e-032	2.2166e+001	0.0000e+000	2.3666e-003
8.0000e+000	1.1000e+002	1	5.8618e-031	3.0542e-036	1.4974e-025	2.1222e+001	0.0000e+000	2.3491e-003
8.0000e+000	1.1500e+002	1	5.2093e-023	1.1604e-026	2.3369e-019	1.9831e+001	0.0000e+000	2.2285e-003
8.0000e+000	1.2000e+002	1	3.6039e-018	1.4671e-020	2.1465e-015	1.8702e+001	0.0000e+000	2.1339e-003
8.0000e+000	1.2500e+002	1	2.3405e-013	4.5200e-015	1.4708e-011	1.7188e+001	0.0000e+000	2.0494e-003
8.0000e+000	1.3000e+002	1	2.2673e-010	1.0501e-011	4.5646e-009	1.5896e+001	0.0000e+000	2.0466e-003
9.0000e+000	8.0000e+001	1	9.6884e-052	5.4684e-059	9.3185e-043	2.3573e+001	0.0000e+000	2.3803e-003
9.0000e+000	8.5000e+001	1	1.2465e-065	9.7423e-076	7.2709e-054	2.4645e+001	0.0000e+000	2.4949e-003
9.0000e+000	9.0000e+001	1	1.9398e-053	3.6600e-061	3.0902e-046	2.3719e+001	0.0000e+000	2.5388e-003
9.0000e+000	9.5000e+001	1	8.2031e-047	2.7841e-053	9.3709e-041	2.3119e+001	0.0000e+000	2.4324e-003
9.0000e+000	1.0000e+002	1	7.0695e-044	5.6340e-050	8.2139e-038	2.2824e+001	0.0000e+000	2.4383e-003
9.0000e+000	1.0500e+002	1	4.0207e-038	2.1583e-044	3.1961e-032	2.2182e+001	0.0000e+000	2.3695e-003
9.0000e+000	1.1000e+002	1	7.2608e-030	4.4673e-035	1.9731e-024	2.1055e+001	0.0000e+000	2.3341e-003
9.0000e+000	1.1500e+002	1	5.2304e-026	3.8034e-030	1.2032e-021	2.0409e+001	0.0000e+000	2.1919e-003
9.0000e+000	1.2000e+002	1	4.6075e-019	1.4865e-021	4.3217e-016	1.8933e+001	0.0000e+000	2.1710e-003
9.0000e+000	1.2500e+002	1	1.9585e-013	4.4566e-015	1.4430e-011	1.7217e+001	0.0000e+000	1.9885e-003
9.0000e+000	1.3000e+002	1	3.2255e-011	1.0437e-012	8.0876e-010	1.6302e+001	0.0000e+000	1.9911e-003

Tabla 5. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con ecualizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.895100e+001
5.000000e+000	8.500000e+001	1	1.889957e+001
5.000000e+000	9.000000e+001	1	1.883459e+001
5.000000e+000	9.500000e+001	1	1.875758e+001
5.000000e+000	1.000000e+002	1	1.867062e+001
5.000000e+000	1.050000e+002	1	1.856860e+001
5.000000e+000	1.100000e+002	1	1.844073e+001
5.000000e+000	1.150000e+002	1	1.828279e+001
5.000000e+000	1.200000e+002	1	1.808361e+001
5.000000e+000	1.250000e+002	1	1.783084e+001
5.000000e+000	1.300000e+002	1	1.751586e+001
6.000000e+000	8.000000e+001	1	1.895100e+001
6.000000e+000	8.500000e+001	1	1.889957e+001
6.000000e+000	9.000000e+001	1	1.883459e+001
6.000000e+000	9.500000e+001	1	1.875758e+001
6.000000e+000	1.000000e+002	1	1.867062e+001
6.000000e+000	1.050000e+002	1	1.856860e+001
6.000000e+000	1.100000e+002	1	1.844073e+001
6.000000e+000	1.150000e+002	1	1.828279e+001
6.000000e+000	1.200000e+002	1	1.808361e+001
6.000000e+000	1.250000e+002	1	1.783084e+001
6.000000e+000	1.300000e+002	1	1.751586e+001
7.000000e+000	8.000000e+001	1	1.895100e+001
7.000000e+000	8.500000e+001	1	1.889957e+001
7.000000e+000	9.000000e+001	1	1.883459e+001
7.000000e+000	9.500000e+001	1	1.875758e+001
7.000000e+000	1.000000e+002	1	1.867062e+001
7.000000e+000	1.050000e+002	1	1.856860e+001
7.000000e+000	1.100000e+002	1	1.844073e+001
7.000000e+000	1.150000e+002	1	1.828279e+001
7.000000e+000	1.200000e+002	1	1.808361e+001
7.000000e+000	1.250000e+002	1	1.783084e+001
7.000000e+000	1.300000e+002	1	1.751586e+001
8.000000e+000	8.000000e+001	1	1.895100e+001
8.000000e+000	8.500000e+001	1	1.889957e+001
8.000000e+000	9.000000e+001	1	1.883459e+001
8.000000e+000	9.500000e+001	1	1.875758e+001
8.000000e+000	1.000000e+002	1	1.867062e+001
8.000000e+000	1.050000e+002	1	1.856860e+001
8.000000e+000	1.100000e+002	1	1.844073e+001
8.000000e+000	1.150000e+002	1	1.828279e+001
8.000000e+000	1.200000e+002	1	1.808361e+001
8.000000e+000	1.250000e+002	1	1.783084e+001
8.000000e+000	1.300000e+002	1	1.751586e+001
9.000000e+000	8.000000e+001	1	1.895100e+001
9.000000e+000	8.500000e+001	1	1.889957e+001
9.000000e+000	9.000000e+001	1	1.883459e+001
9.000000e+000	9.500000e+001	1	1.875758e+001
9.000000e+000	1.000000e+002	1	1.867062e+001
9.000000e+000	1.050000e+002	1	1.856860e+001
9.000000e+000	1.100000e+002	1	1.844073e+001
9.000000e+000	1.150000e+002	1	1.828279e+001
9.000000e+000	1.200000e+002	1	1.808361e+001
9.000000e+000	1.250000e+002	1	1.783084e+001
9.000000e+000	1.300000e+002	1	1.751586e+001

Tabla 6. Medidas de OSNR. Configuración 5 mono canal, con equalizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 3 mw. Rango de taps de 5 a 9.

Análisis de Desempeño de Diferentes Técnicas de Compensación Ópticas y Electrónicas para la Dispersión Cromática en Redes WDM.

Numero_taps	smf_length_km	RUN#	BER	BER_lo	BER_hi	Q ² (dB)	Eye Hght(V)	Eye Hght(V)
5.0000e+000	8.0000e+001	1	3.5174e-072	5.0709e-082	2.2337e-060	2.5071e+001	0.0000e+000	3.3267e-003
5.0000e+000	8.5000e+001	1	8.9093e-073	5.5403e-083	4.8897e-060	2.5108e+001	0.0000e+000	3.4053e-003
5.0000e+000	9.0000e+001	1	7.9650e-053	7.0805e-060	8.1161e-046	2.3667e+001	0.0000e+000	3.2160e-003
5.0000e+000	9.5000e+001	1	6.4524e-049	3.0722e-056	4.2510e-042	2.3318e+001	0.0000e+000	3.1852e-003
5.0000e+000	1.0000e+002	1	8.0973e-048	1.9563e-054	1.9135e-040	2.3215e+001	0.0000e+000	3.2074e-003
5.0000e+000	1.0500e+002	1	1.8174e-037	5.3127e-043	3.7583e-031	2.2102e+001	0.0000e+000	3.0295e-003
5.0000e+000	1.1000e+002	1	9.9922e-031	4.1373e-036	2.9475e-025	2.1187e+001	0.0000e+000	3.1245e-003
5.0000e+000	1.1500e+002	1	1.1462e-023	1.8649e-027	9.8101e-020	1.9965e+001	0.0000e+000	2.8218e-003
5.0000e+000	1.2000e+002	1	2.8206e-018	1.2267e-020	1.7938e-015	1.8730e+001	0.0000e+000	2.7406e-003
5.0000e+000	1.2500e+002	1	8.9865e-014	1.5852e-015	6.5476e-012	1.7341e+001	0.0000e+000	2.5287e-003
5.0000e+000	1.3000e+002	1	8.6685e-011	3.1175e-012	2.0268e-009	1.6101e+001	0.0000e+000	2.3636e-003
6.0000e+000	8.0000e+001	1	2.9687e-077	1.4280e-086	2.7823e-065	2.5375e+001	0.0000e+000	3.3315e-003
6.0000e+000	8.5000e+001	1	5.2219e-067	1.0389e-076	3.0984e-055	2.4738e+001	0.0000e+000	3.2480e-003
6.0000e+000	9.0000e+001	1	5.9086e-047	4.9487e-053	3.2949e-041	2.3133e+001	0.0000e+000	3.2379e-003
6.0000e+000	9.5000e+001	1	1.5198e-043	1.3051e-049	7.0759e-038	2.2790e+001	0.0000e+000	3.2184e-003
6.0000e+000	1.0000e+002	1	1.1425e-037	3.7104e-043	2.0820e-032	2.2127e+001	0.0000e+000	3.2346e-003
6.0000e+000	1.0500e+002	1	8.9052e-038	6.9874e-045	3.0206e-031	2.2140e+001	0.0000e+000	3.1629e-003
6.0000e+000	1.1000e+002	1	5.9778e-031	2.3102e-036	1.2666e-025	2.1220e+001	0.0000e+000	3.0780e-003
6.0000e+000	1.1500e+002	1	6.2659e-024	9.8784e-028	5.6091e-020	2.0017e+001	0.0000e+000	2.8092e-003
6.0000e+000	1.2000e+002	1	6.5160e-019	2.4716e-021	5.4782e-016	1.8895e+001	0.0000e+000	2.8312e-003
6.0000e+000	1.2500e+002	1	4.1129e-014	7.4475e-016	3.0466e-012	1.7463e+001	0.0000e+000	2.6701e-003
6.0000e+000	1.3000e+002	1	1.7723e-011	8.0434e-013	3.3412e-010	1.6420e+001	0.0000e+000	2.6459e-003
7.0000e+000	8.0000e+001	1	5.1077e-076	1.6740e-085	1.0026e-063	2.5303e+001	0.0000e+000	3.3530e-003
7.0000e+000	8.5000e+001	1	2.0785e-066	1.5230e-076	1.7783e-054	2.4697e+001	0.0000e+000	3.2764e-003
7.0000e+000	9.0000e+001	1	4.2664e-055	3.3036e-063	1.8821e-047	2.3857e+001	0.0000e+000	3.3749e-003
7.0000e+000	9.5000e+001	1	4.1629e-049	6.4705e-056	1.1947e-042	2.3336e+001	0.0000e+000	3.2257e-003
7.0000e+000	1.0000e+002	1	2.1663e-038	2.1112e-044	1.1875e-032	2.2214e+001	0.0000e+000	3.1731e-003
7.0000e+000	1.0500e+002	1	3.2309e-039	4.1642e-046	9.8836e-033	2.2311e+001	0.0000e+000	3.1610e-003
7.0000e+000	1.1000e+002	1	3.7158e-031	1.4451e-036	7.9001e-026	2.1251e+001	0.0000e+000	3.0790e-003
7.0000e+000	1.1500e+002	1	8.2520e-024	1.5380e-027	4.5901e-020	1.9993e+001	0.0000e+000	2.9819e-003
7.0000e+000	1.2000e+002	1	6.6817e-019	2.0524e-021	8.2809e-016	1.8892e+001	0.0000e+000	2.8804e-003
7.0000e+000	1.2500e+002	1	4.2206e-013	8.8268e-015	3.4822e-011	1.7091e+001	0.0000e+000	2.6334e-003
7.0000e+000	1.3000e+002	1	1.6401e-010	6.3398e-012	3.9281e-009	1.5966e+001	0.0000e+000	2.6596e-003
8.0000e+000	8.0000e+001	1	1.2639e-077	1.7614e-087	7.3583e-065	2.5396e+001	0.0000e+000	3.3709e-003
8.0000e+000	8.5000e+001	1	8.3463e-068	1.5714e-078	1.9835e-055	2.4791e+001	0.0000e+000	3.2996e-003
8.0000e+000	9.0000e+001	1	8.7478e-056	7.3318e-064	3.1742e-048	2.3913e+001	0.0000e+000	3.4194e-003
8.0000e+000	9.5000e+001	1	4.5669e-049	5.6700e-056	1.2526e-042	2.3332e+001	0.0000e+000	3.2415e-003
8.0000e+000	1.0000e+002	1	1.1435e-043	8.3520e-050	9.0056e-038	2.2802e+001	0.0000e+000	3.2399e-003
8.0000e+000	1.0500e+002	1	7.7150e-039	2.6856e-045	8.0678e-033	2.2267e+001	0.0000e+000	3.1519e-003
8.0000e+000	1.1000e+002	1	6.7870e-032	2.2387e-037	2.3875e-026	2.1360e+001	0.0000e+000	3.1296e-003
8.0000e+000	1.1500e+002	1	4.5737e-023	1.0327e-026	1.9002e-019	1.9843e+001	0.0000e+000	2.9719e-003
8.0000e+000	1.2000e+002	1	1.6643e-018	5.9602e-021	1.0950e-015	1.8790e+001	0.0000e+000	2.8563e-003
8.0000e+000	1.2500e+002	1	1.2243e-013	2.2577e-015	8.1959e-012	1.7292e+001	0.0000e+000	2.7412e-003
8.0000e+000	1.3000e+002	1	1.2902e-010	5.7691e-012	2.7409e-009	1.6017e+001	0.0000e+000	2.7455e-003
9.0000e+000	8.0000e+001	1	4.8718e-068	3.0865e-078	1.5683e-056	2.4806e+001	0.0000e+000	3.2812e-003
9.0000e+000	8.5000e+001	1	2.7749e-066	1.4372e-076	1.8092e-054	2.4689e+001	0.0000e+000	3.3218e-003
9.0000e+000	9.0000e+001	1	2.2412e-053	4.4143e-061	3.6431e-046	2.3714e+001	0.0000e+000	3.3691e-003
9.0000e+000	9.5000e+001	1	3.5246e-047	1.2851e-053	4.6010e-041	2.3154e+001	0.0000e+000	3.2569e-003
9.0000e+000	1.0000e+002	1	4.0440e-044	5.9212e-050	2.5782e-037	2.2849e+001	0.0000e+000	3.1898e-003
9.0000e+000	1.0500e+002	1	5.4664e-039	1.9422e-045	5.6071e-033	2.2285e+001	0.0000e+000	3.1560e-003
9.0000e+000	1.1000e+002	1	1.1370e-030	4.4950e-036	4.0775e-025	2.1178e+001	0.0000e+000	3.1096e-003
9.0000e+000	1.1500e+002	1	2.7824e-025	2.9979e-029	3.6680e-021	2.0276e+001	0.0000e+000	2.9279e-003
9.0000e+000	1.2000e+002	1	1.8538e-019	5.1438e-022	1.9846e-016	1.9032e+001	0.0000e+000	2.9017e-003
9.0000e+000	1.2500e+002	1	9.5601e-014	2.0357e-015	7.8360e-012	1.7331e+001	0.0000e+000	2.6628e-003
9.0000e+000	1.3000e+002	1	1.7840e-011	5.4936e-013	4.7449e-010	1.6418e+001	0.0000e+000	2.6670e-003

Tabla 7. BER estimada, Factor Q estimado, apertura del ojo. Configuración 5 mono canal, con equalizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Numero_de_taps	smf_length_km	RUN#	Opt. SNR(dB)
5.000000e+000	8.000000e+001	1	1.894026e+001
5.000000e+000	8.500000e+001	1	1.889669e+001
5.000000e+000	9.000000e+001	1	1.884188e+001
5.000000e+000	9.500000e+001	1	1.877801e+001
5.000000e+000	1.000000e+002	1	1.870816e+001
5.000000e+000	1.050000e+002	1	1.862830e+001
5.000000e+000	1.100000e+002	1	1.852877e+001
5.000000e+000	1.150000e+002	1	1.840670e+001
5.000000e+000	1.200000e+002	1	1.825208e+001
5.000000e+000	1.250000e+002	1	1.805347e+001
5.000000e+000	1.300000e+002	1	1.780279e+001
6.000000e+000	8.000000e+001	1	1.894026e+001
6.000000e+000	8.500000e+001	1	1.889669e+001
6.000000e+000	9.000000e+001	1	1.884188e+001
6.000000e+000	9.500000e+001	1	1.877801e+001
6.000000e+000	1.000000e+002	1	1.870816e+001
6.000000e+000	1.050000e+002	1	1.862830e+001
6.000000e+000	1.100000e+002	1	1.852877e+001
6.000000e+000	1.150000e+002	1	1.840670e+001
6.000000e+000	1.200000e+002	1	1.825208e+001
6.000000e+000	1.250000e+002	1	1.805347e+001
6.000000e+000	1.300000e+002	1	1.780279e+001
7.000000e+000	8.000000e+001	1	1.894026e+001
7.000000e+000	8.500000e+001	1	1.889669e+001
7.000000e+000	9.000000e+001	1	1.884188e+001
7.000000e+000	9.500000e+001	1	1.877801e+001
7.000000e+000	1.000000e+002	1	1.870816e+001
7.000000e+000	1.050000e+002	1	1.862830e+001
7.000000e+000	1.100000e+002	1	1.852877e+001
7.000000e+000	1.150000e+002	1	1.840670e+001
7.000000e+000	1.200000e+002	1	1.825208e+001
7.000000e+000	1.250000e+002	1	1.805347e+001
7.000000e+000	1.300000e+002	1	1.780279e+001
8.000000e+000	8.000000e+001	1	1.894026e+001
8.000000e+000	8.500000e+001	1	1.889669e+001
8.000000e+000	9.000000e+001	1	1.884188e+001
8.000000e+000	9.500000e+001	1	1.877801e+001
8.000000e+000	1.000000e+002	1	1.870816e+001
8.000000e+000	1.050000e+002	1	1.862830e+001
8.000000e+000	1.100000e+002	1	1.852877e+001
8.000000e+000	1.150000e+002	1	1.840670e+001
8.000000e+000	1.200000e+002	1	1.825208e+001
8.000000e+000	1.250000e+002	1	1.805347e+001
8.000000e+000	1.300000e+002	1	1.780279e+001
9.000000e+000	8.000000e+001	1	1.894026e+001
9.000000e+000	8.500000e+001	1	1.889669e+001
9.000000e+000	9.000000e+001	1	1.884188e+001
9.000000e+000	9.500000e+001	1	1.877801e+001
9.000000e+000	1.000000e+002	1	1.870816e+001
9.000000e+000	1.050000e+002	1	1.862830e+001
9.000000e+000	1.100000e+002	1	1.852877e+001
9.000000e+000	1.150000e+002	1	1.840670e+001
9.000000e+000	1.200000e+002	1	1.825208e+001
9.000000e+000	1.250000e+002	1	1.805347e+001
9.000000e+000	1.300000e+002	1	1.780279e+001

Tabla 8. Medidas de OSNR. Configuración 5 mono canal, con equalizador en cascada FFE-NL y DFE en el lugar del receptor, y formato NRZ-DPSK. Rango de SMF-28 de 80 a 130 km. Potencia de transmisión 4 mw. Rango de taps de 5 a 9.

Anexo Z: Diagramas del ojo configuración 5 con ecualizadores FFE-NL, DFE y FFE-NL y DFE en cascada en el lugar del receptor, cuatro canales y formato de modulación NRZ-OOK.

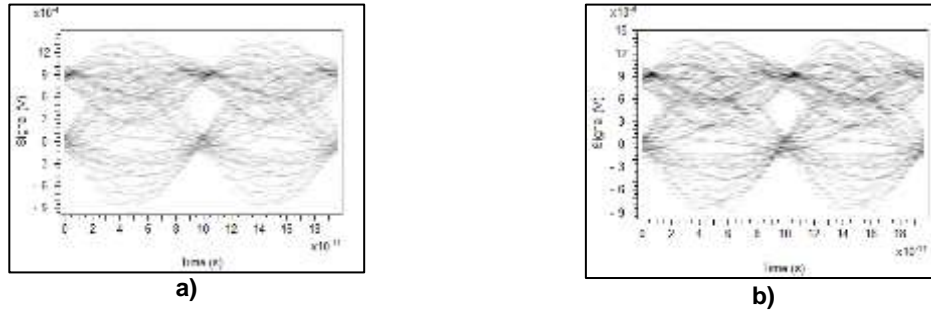


Figura.1. Diagrama del ojo del canal a) 18, b) 21. Configuración 5 cuatro canales, con un ecualizador FFE-NL en el lugar del receptor y formato de modulación NRZ-DPSK.

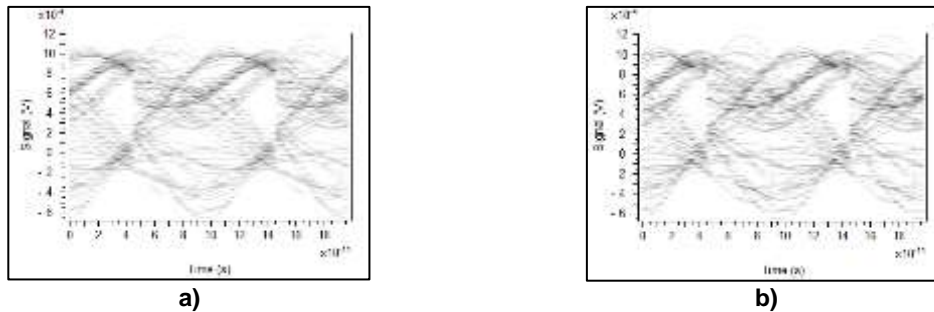


Figura 2. Diagrama del ojo del canal a) 18, b) 21. Configuración 5 cuatro canales, con un ecualizador DFE en el lugar del receptor y formato de modulación NRZ-DPSK

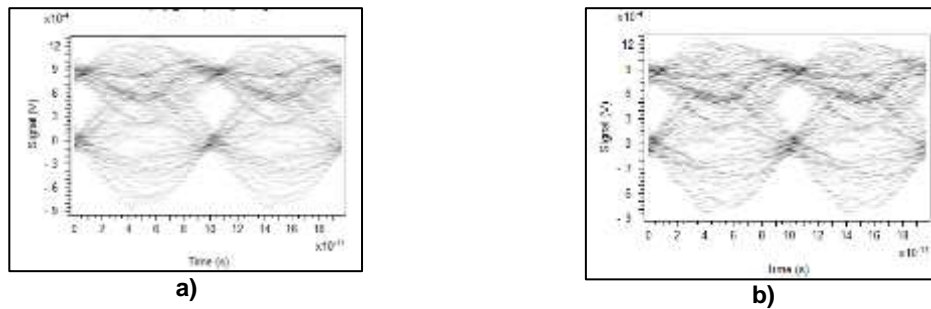


Figura 3. Diagrama del ojo del canal a) 18, b) 21. Configuración 5 cuatro canales, con un ecualizador en cascada FFE-NL y DFE en el lugar del receptor y formato de modulación NRZ-DPSK.