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Power level management for metro optical networks

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***Abstract*—Based on various performance techniques available for optical metro communication system, in this paper, we compared various decibel based power amplifier eye opening diagram analysis in case of linear amplifier simulation setup.**
***Keywords*—TRX, WCC, WSON, BER, SMF**

I. INTRODUCTION

CAPEX or energy consumption is the optimization metric. Considering a fMLR network and an elastic network where the same datarates are available, elastic TRX have the same cost independently of the modulation format while the cost of a fixed-rate TRX grows linearly (with parameter α) with the data rate. Other cost models could easily be considered [1-4]. Optical core transport networks are evolving from opaque networks with optical-electronic optical (O/E/O) conversions at each node toward transparent wavelength switched optical networks (WSONs) [5]. Row constraints impose fundamental limitations on a transparent WSON. The first one, referred to as the wavelength continuity constraint (WCC), requires that the wavelength assigned to a given connection on each link be the same along a light path. The second one is signal degradation due to physical impairments, such as amplified [6]. Clearly, due to the lack of re-amplifying, reshaping, and retiming (3R) regenerators for wavelength conversion and signal regeneration in transparent WSONs, neither constraint can easily be alleviated, which will degrade the network performance significantly and limit the network size [7]. In this context, the translucent WSON, with sparsely but strategically deployed 3R regenerators to relax the WCC and compensate for signal impairments if required, attains an adequate trade-off between network cost and service provisioning performance. From the carrier's point of view, the translucent WSON is a promising paradigm for commercial deployment because extensive recent studies indicate that even if only a few 3R regenerators are employed, a translucent WSON significantly outperforms a transparent one, achieving satisfactory performance, close to that of an opaque network [8].

II. SIMULATION SETUP

WDM Analyzer is attached with the optical fiber (SMF-28 4) of length 50km. Input of optical fiber (SMF-28 4) is given to the input of DM_LRE Tx/Rx. Output of DM_LRE Tx/Rx is given to the input of the optical fiber (SMF-28 1). Then the output of optical fiber is given to the input of the Ring Control.Optical Ring Control allows the user to build systems using ring structures with optical signals.

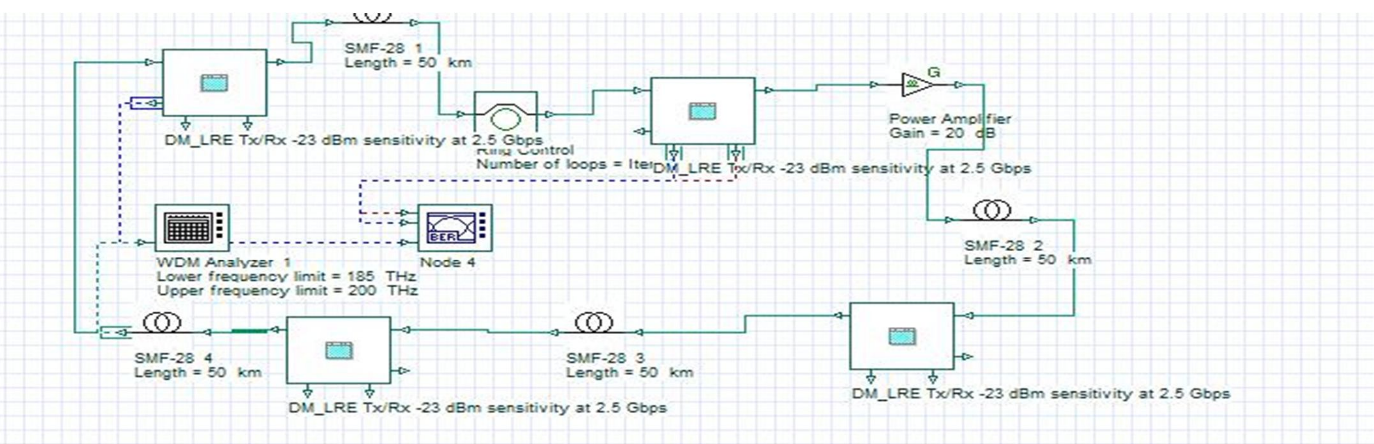

Fig 1: simulation set up of linear amplifier

Output of optical Ring Control of 5 iterations is given to the input of DM_LRE Tx/Rx. After that output of DM_LRE Tx/Rx is attached with the input of a power amplifier of gain 53 dB and power of 10 dBm. Output of power amplifier is given to the optical fiber (SMF-28 2) which simulates propagation of optical field in single mode fiber. Output of optical fiber of length 50 km is given to the input of DM_LRE Tx/Rx. Then again the output of DM_LRE Tx/Rx is given to the optical fiber (SMF- 28 3). After that output of optical fiber is then attached to the DM_LRE Tx/Rx. Output is received at the BER Analyzer which allows the user to calculate and display bit error rate of an electrical signal.

III.RESULTS AND DISCUSSION

The performance of power level management using linear amplifier is given below showing the various results at the 20 dB values

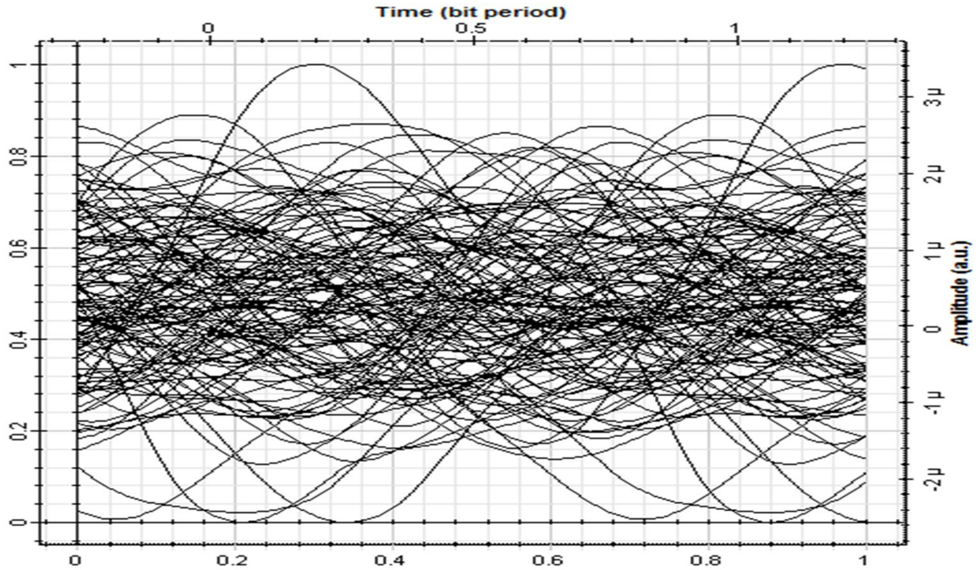

Fig 2. Eye diagram for 20 dB power amplifier gain

Optital metro network system setup is examined at different Power amplifier gain various parameters are analysed in order to obtain the best operating When the system performance was analysed up to 20 dB of optical metro network system using the linear amplifier configurations,The results obtained were not satisfactory, it introduced distortions in the signal. Fig 2 shows the eye diagram at 20dB, the obtained eye diagram has very low signal quality and obtained jitter is also high. So the overall performance of the system was very poor**.** With further variation in the whole system will be done on the basis of alterations in the dB power amplifier gain values of linear amplifier gain at the different values like 30,40 db etc and the further analysis of the system would get done and on this basis the final and the suitable set up would be considered for the designing purposes.

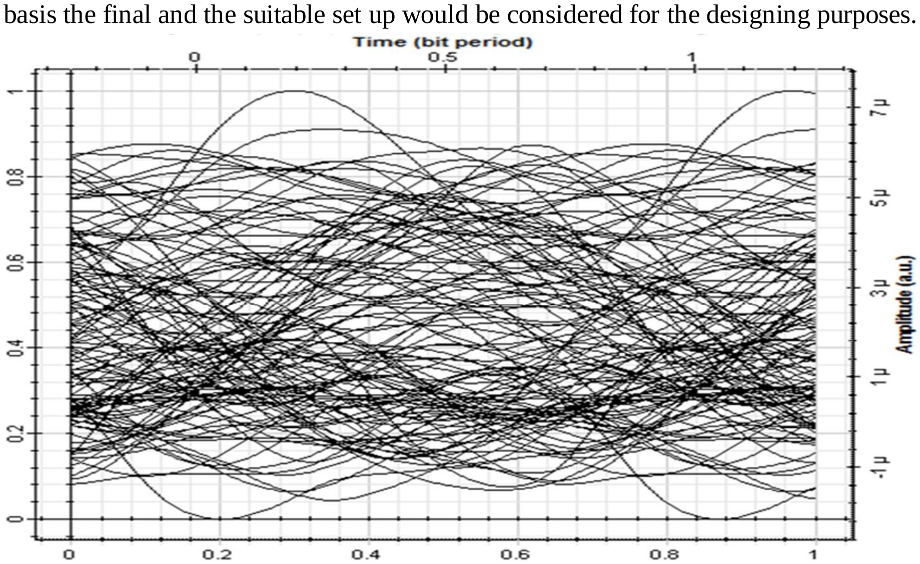

Fig 3. Eye diagram for 30 dB power amplifier gain

The performance of power level management using linear amplifier is given in figure 3 showing the various results at the 30 dB values. Optital metro network system setup is examined at different Power amplifier gain various parameters are analysed in order to obtain the best operating When the system performance was analysed up to 30 dB of optical metro network system using the linear amplifier configurations, The results obtained were not satisfactory, it introduced distortions in the signal. Fig 3 shows the eye diagram at 30 dB, the obtained eye diagram has very low signal quality and obtained jitter is also high. So the overall performance of the system was very poor**.** With further variation in the whole system will be done on the basis of alterations in the dB power amplifier gain values of linear amplifier gain at the different values like 40,50 db etc and the further analysis of the system would get done and on this basis the final and the suitable set up would be considered for the designing purposes.

The performance of power level management using linear amplifier is given below showing the various results at the 40 dB value.

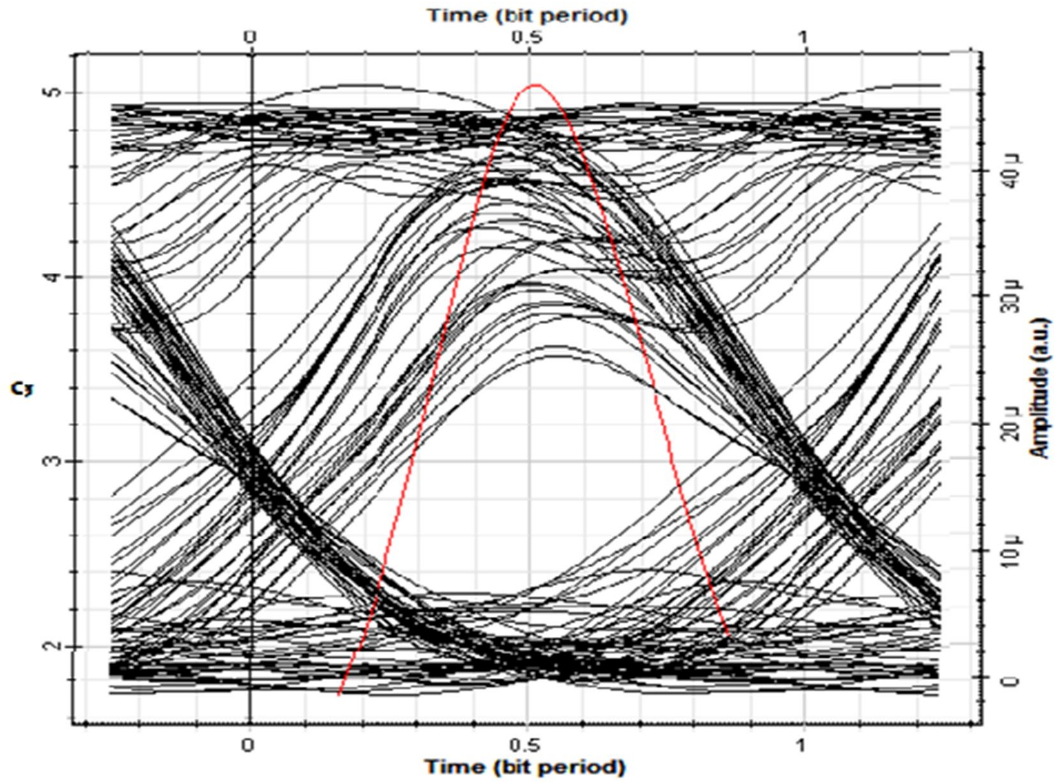

Fig 4. Eye diagram for 40 dB power amplifier gain

Optital metro network system setup is examined at different Power amplifier gain various parameters are analysed in order to obtain the best operating When the system performance was analysed up to 40 dB of optical metro network system using the linear amplifier configurations, The results obtained were not satisfactory, it introduced distortions in the signal. Fig 4 shows the eye diagram at 40 dB, the obtained eye diagram has very low signal quality and obtained jitter is also high. So the overall performance of the system was very poor**.** With further variation in the whole system will be done on the basis of alterations in the dB power amplifier gain values of linear amplifier gain at the different value like 50 db etc and the further analysis of the system would get done and on this basis the final and the suitable set up would be considered for the designing purposes.

The results obtained were not satisfactory, it introduced distortions in the signal. Fig 4 shows the eye diagram at 40 dB, the obtained eye diagram has very low signal quality and obtained jitter is also high. So the overall performance of the system was very poor**.** With further variation in the whole system will be done on the basis of alterations in the dB power amplifier gain values of linear amplifier gain at the different value like 50 db etc and the further analysis of the system would get done and on this basis the final and the suitable set up would be considered for the designing purposes. In order to obtain the optimum power amplifier gain given system performance is further analyzed for the 50 dB. Fig 5 shows the eye diagram for 50 dB power amplifier gain. Here we obtained the clear eye diagram with high quality factor with very less BER. Although the results obtain with 40 dB where also

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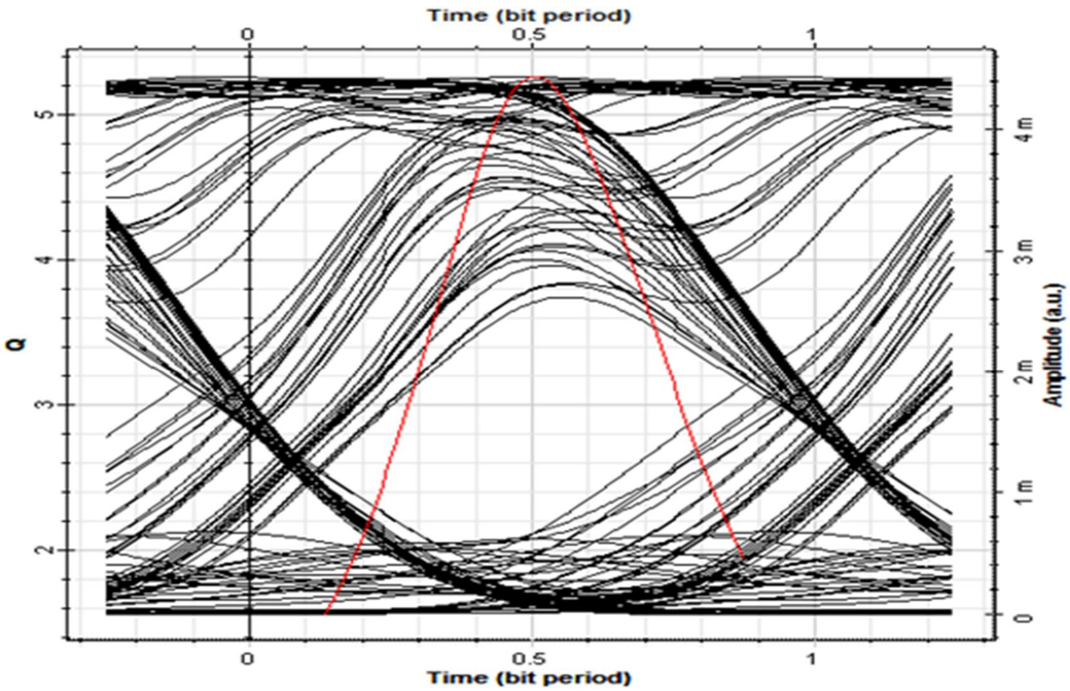
satisfactory but best results are obtained at 50 dB power amplifier gain as well as the results taken previously with the data figures are also not as such as we are required with the necessary results to be taken out in the case of 50 In this chapter present work related Power level management using amplifier gain

The performance of power level management using linear amplifier is given below showing the various results at the 50 dB



Eye diagram for 50 dB power amplifier gain

IV. CONCLUSION

The metro network network system with the usage of linear amplifier in an optical domain with the alteration in the power amplifier gain at (20,30,40,50) db it is superficially observed that the results taken out to be at the 50 db characteristics comes out to be more satisifactory with less BER high Q-factor.

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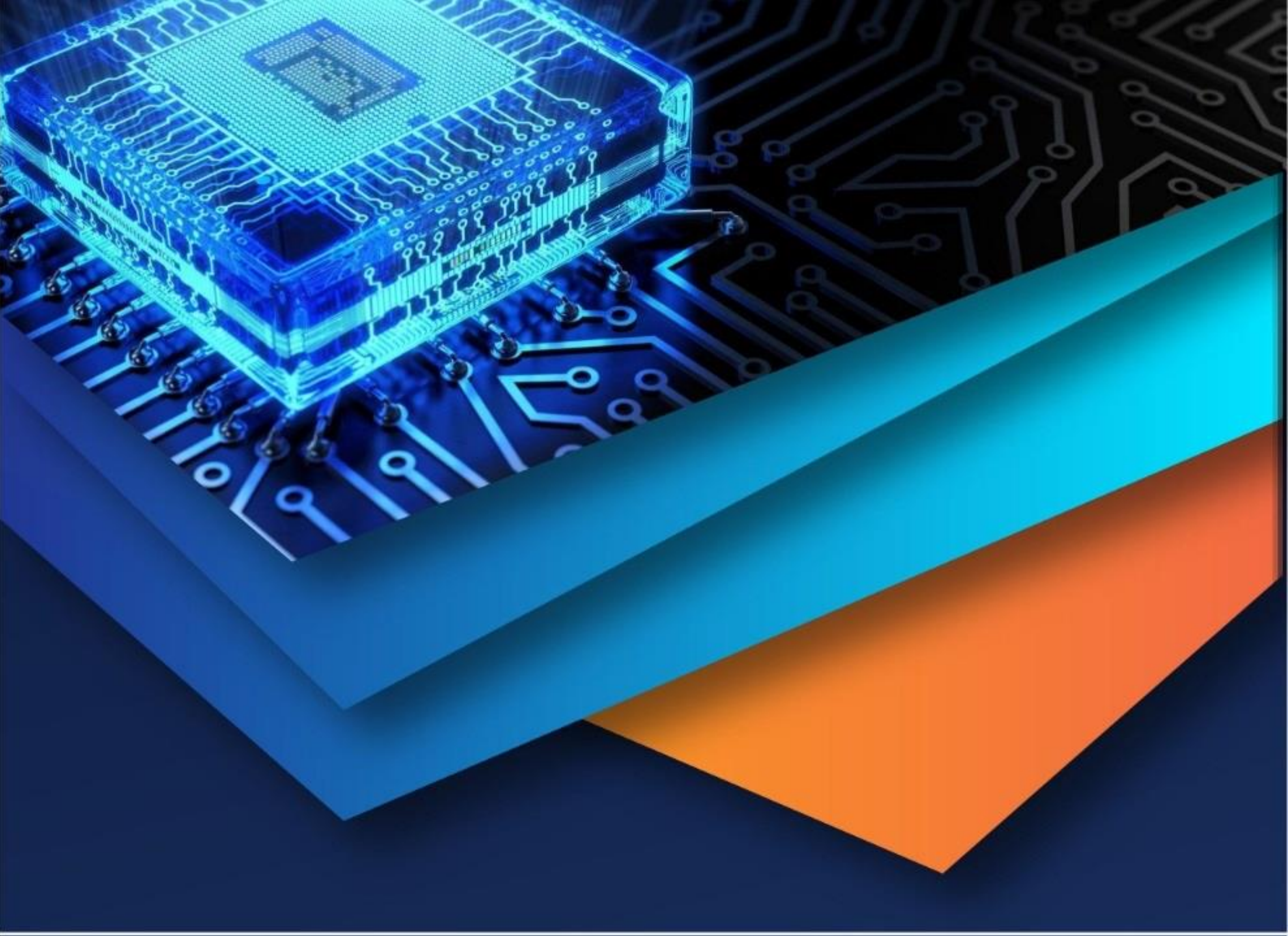

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