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MITIGATION OF NONLINEAR EFFECTS IN FIBER OPTIC DWDM SYSTEM

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Abstract - The Optical Communication System is most widely used nowadays. The Optical communication system has several advantages which increase tshe ability of communication system. DWDM optical communication system decrease channel spacing can enlarge fiber nonlinearities. DWDM is most widely used for high-speed data transmission for long-distance.When some time channel spacing is decreased then the nonlinear effect is increased. Some types of nonlinearity effect are XPM, FWM, CPM and SBS, SRS. The FWM nonlinear effect is reduced by chromatic dispersion. In this paper, we have studied how to the mitigate nonlinearity losses by testingvarious simulation parameter and Modulation techniques or Advanced techniques. The Simulation parameters are used to control nonlinear effects. The simulation study is used in OPTISYSTEM software.

***Key Words*: DWDM, FWM, SRS, SBS, chromatic dispersion, modulation techniques, circular polarizers, optimum input power.**

1. INTRODUCTION

In fiber-optic communication, dense wavelength division multiplexing is a technology which multiplexes data signals transfer one place to another place.The DWDM system is an optical technology used to increase bandwidth and increase channel spacing. Wavelength division multiplexing is the technique of data transmission by splitting and modulatesthe multiple wavelengths of light in which more channel spacing compares to DWDM that is known as a WDM system. Channel ability can be increased in two forms someone rise number of channels and rise data rate. When the rising channel of numbersrequirement,channel spacing is in decrease that is called the DWDM system.

The DWDM system have various nonlinearity effects when increase channel spacing in which, two types nonlinearities refractive index and inelastic scattering effects. The nonlinear refractive index is 3- types XPM, FWM, SPM, and inelastic scattering is two types of SBS and SRS. The DWDM system is most widely used in bandwidth increase and high speed data transmission for long distance. The input power is increased by the refractive index. The nonlinear effect reduces by modulation techniques, simulation parameters and suitable reduction techniques.The simulation parameter is known as chromatic dispersion and channel spacing. FWM effect can be reduced by Optimum allocation of chromatic dispersion and unmatched channel spacing. High bandwidth can use in unequal channel spacing. In this method, nonlinear losses can be decreased by using modulation techniques and suitable techniques.

2. LITERATURE REVIEW

Sino	Authors	Paper Title	Technology used
1	T.Sabapathi.	Mitigation of nonlinearityi nthe DWDM system	In this paper study about the DWDM system and nonlinearities in fiber optic communication and reduced the nonlinearities effect by using modulation techniques and suitable techniques.
2	Mehtab Singh	the effect of chromatic dispersion and channel spacing coefficient on the FWM effect in the WDM system	This paper study about of WDM system. Which are capable of Transmitting data at a high data rate but some serious problems which degrade the performance of the optical transmission system. Some nonlinearities like FWM are reduced by using modulation techniques.
3	Gouri Deshmukh.	FWM nonlinearity effect DWDM System	In this paper, the Optical Nonlinearities give growth to many universal effects in optical fiber. These effects are very harmful in the optical

			communication DWDM system to communicate different channels. the nonlinear effect such as SRS, SBS, FWM, XPM, SPM, and distress issues for the FWM effect.
4	Mehtab Singh, Vishal Sharma	Channel Spacing and transmission power. Checkout of effect FWM at different.	In this paper, we are studying about n fiber optic c transmission system more benefits communication system significantly low loss and large bandwidth. High bandwidth in optical communication increased by using the WDM. The FWM nonlinear effect is mostly in the fiber optic communication system.
5	Manoj Kumar.	Mitigate the distortion in the FWM system 32 channel long haul DWDM.	In this paper, the nonlinear effect in the DWDM system FWM effect has been mitigated and estimate by using the Optical phase Conjugator.Dispersion Recompense has been occupied chromatic the collected chromatic dispersion in a considered 32 channels.
6	Shreya Garg.	The FWM Optical transmission DWDM system.	This paper study about of DWDM optical transmission system used in different modulation techniques for high-speed optical communication. Coherent digital optical transmission enables a new generation of high-speed optical data transport and fiber losses mitigation.
7	Habib UllahManzoor, ashiq Hussain.	FWM nonlinearities effect decrease the use of different modulation techniques and optical filter DWDM system	In this paper study about nonlinearities effects like SBS, SRS, and FWM. The main aim of this paperwork f value of spectral with, dispersion and channel spacing.
8	Munish Singh.	Analysis performance in the DWDM System.	In this paper, we study about design an 80 channel DWDM system with each channel having 10 Gbps data multiplexed with frequency spacing 100Ghz. The system performance is limited by the dispersion effects that reduced the fiber nonlinearities.
9	Inwood Kim, PaparoPalacharla, Tadashi Ikeuchi.	Multi-channel fiber nonlinear effect mitigation in the DWDM system.	In this paper Reduce fiber nonlinearities distortions in high-speed DWDM optical fiber communication system by applying time-domain fractional Fourier based on time-space duality.
10	Maryam Niknamfar, Mehdi Shantaram	optical single configuration and fiber transmission and multi-type data communicate the DWDM system.	In this paper, we study the DWDM system reduced the nonlinearities use the different techniques in this system.
11	Prabhpreet	Analysis of	In this paper

	Kaur, Kulwinder Singh	FWM Effect at multichannel in channel spacing.	Analysis of four WDM, sixteen channel WDM has been compared fo channel spacing. In this paper simulated that on increasing the spacing between input channels.
12	VardgesVardanyan	Nonlinear effect FWM products transmission DWDM system.	In this paper the combined action SRS and FWM in the WDM system. Arbitrarily large WDM system. FWM leads to phase-sensitive periodic energy exchanges among channels the effect the Raman scattering.

3. PROPOSED METHODOLOGY

In this paper, we have the studies of nonlinear effects in the dense wave length division multiplexer system. In which the nonlinear effect reduced by using modulation techniques and simulation parameter techniques or advanced techniques. The FWM effect can be decreased through channel spacing and chromatic dispersion.

4. CONCLUSION

In this paper we have study about reducing the nonlinear effect of the DWDM system. The nonlinear effects are reduced by using modulation techniques and suitable techniques. There are two type nonlinear effects, Refractive index and inelastic scattering. The DWDM system is most widely used in bandwidth increase and high-speed data transmission in which DWDM system use simulation parameters and suitable reduction techniques to reduce nonlinear effects in system.

The simulation parameters use to mitigate non-linear effect are chromatic dispersion and channel spacing in which perform the simulation parameters, modulation techniques and suitable techniques in the optisystem software. FWM effect decrease by Optimum allocation of chromatic dispersion in which use different techniques to reduce nonlinear effect in DWDM system.

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