

Realization of Soliton Phase Characteristics in 10 Gbps, Single Channel, Uncompensated Telecommunication System

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Abstract : In this paper, the dependence of soliton pulses with respect to phase in a 10 Gbps, single channel, dispersion uncompensated telecommunication system was studied. The characteristic feature of periodic soliton interaction was noted at the Interaction point ($I=6202.5\text{Km}$) in one collision length of $L=12405.1\text{ Km}$. The interaction point is located for 10Gbps system with an initial relative spacing (q_0) of soliton as 5.28 using Perturbation theory. It is shown that, when two in-phase solitons are launched, they interact at the point $I=6202.5\text{ Km}$, but the interaction could be restricted with introduction of different phase initially. When the phase of the input solitons increases, the deviation of soliton pulses at the I also increases. We have successfully demonstrated this effect in a telecommunication set-up in terms of Quality factor (Q), where the $Q=0$ for in-phase soliton. The Q was noted to be 125.9, 38.63, 47.53, 59.60, 161.37, and 78.04 for different phases such as 10o, 20o, 30o, 45o, 60o and 90o degrees respectively at Interaction point I .

Keywords : Soliton interaction, Initial relative spacing, phase, Perturbation theory and telecommunication system

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