Soliton Switching in Fiber Coupler with Periodically Modulated Dispersion, Coupling Constant Dispersion and Cubic Quintic Nonlinearity

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In this paper we present the soliton dynamics in a two port fiber nonlinear directional coupler with periodically modulated dispersion and coupling constant dispersion that arose due to the intermodal dispersion between symmetric and antisymmetric modes of the coupler. The fiber material possessed cubic quintic nonlinearity. The influences of the coupling constant dispersion, periodically modulated dispersion and quintic nonlinearity on the soliton switching dynamics have been comprehensively studied. The expressions for the transmission coefficient, cross talk and extinction ratio have been derived in the context of both quintic nonlinearity and periodically modulated dispersion. It has been found that an increase in the value of the quintic nonlinearity has detrimental influence on the soliton switching. Our analytical results have been supported by numerical simulation.