Numerical simulations of the propagation of Chirped Vector Soliton in optical fibers with variable coefficients in the presence of third order dispersion and power law nonlinearity

AZIEZ SIHAM, BAHLOUL DERRADJI

Abstract : We study in this work, the numerical simulations of propagation of chirped vector solitons in optical fiber systems using the compact split step Padé scheme (CSSPS). This study is done in the case of variable coefficients and in the presence of third order dispersion and power law nonlinearity. A negative chirp makes the soliton broadening, while; a positive chirp leads to a soliton compression. The effect of chirp on the soliton temporal width of an amplification system is greater than that in a loss system. In the presence of third order dispersion, we note an increase of the pulse width with an asymmetric oscillation on the trailing edge. In the same time, we note a shift of the center of the two components of the one managed chirped vector soliton along the propagation distance. It is clearly noted from plot that, the quintic nonlinearity has a marginal role on the propagation characteristics of the two components of managed chirped vector soliton.

Keywords : vector solitons, chirped solitons, birefringent optical fibers, compact split step Padé scheme, coupled higherorder nonlinear Schrodinger equations with variable coefficients