

# Propagation characteristics of chirped vector soliton in birefringent optical fibers with variable coefficients in the presence of third order dispersion

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**Abstract :** We study in this work, the propagation characteristics 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 the presence of third order dispersion. 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 ( $\gamma > 0$ ) is greater than that in a loss system ( $\gamma < 0$ ). 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.

**Keywords :** vector soliton, chirped soliton, optical fibers, compact split step Padé scheme, coupled higher-order nonlinear Schrodinger equations, dispersion management, nonlinearity management, temporal waveform, third order dispersion.