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# Semi-implicit operator splitting Padé method for vector HNLS solitons

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**Abstract:** We use in this paper the semi-implicit finite difference operator splitting Padé (OSPD) method for solving the coupled higher-order nonlinear Schrödinger equation, which describes the propagation of vector solitons in optical fibers. This method having a fourth order accuracy in space shows good stability and efficiency for the coupled HNLS equations describing vector solitons. We have tested this method for analyzing the behavior of optical pulses in birefringent fibers verifying that the third order dispersion TOD has different effects on the two polarizations and the asymmetric oscillation is significant only in one polarization.

**Keywords :** Birefringence, vector solitons, optical fibers, Operator Splitting Padé Method, coupled higher-order nonlinear Schrodinger equation, third order dispersion.