CUBIC-QUARTIC OPTICAL SOLITONS IN BIREFRINGENT FIBERS WITH NON-LOCAL LAW NONLINEARITY

Khalil S. Al-Ghafri*,

Mathematics and Computing Skills Unit, University of Technology and Applied Sciences, P.O. Box 466, Ibri 516, Oman

ABSTRACT

The present study discusses the investigation of optical solitons in birefringent fibers with cubic-quartic dispersion. The nonlinear effect in this medium is considered because of non-local law in presence of perturbation terms. The model is dealt with analytical strategy using the traveling wave hypothesis to reach an ordinary differential equation. To detect various exact solutions, the later equation is handled by projective Riccati equations method. Miscellaneous optical soliton solutions such as bright, dark, singular and M-shaped solitons are derived based on parameter restrictions. The visual representations of these wave structures are illustrated to reveal their complex physical aspects.

***K*eywords** Optical solitons · Cubic-quartic dispersion · birefringent fibers · non-local law · Projective Riccati equations method

References

[1] Zayed E. M., El-Horbaty M., and Alngar M. E. Cubic-quartic optical soliton perturbation having four laws non-linearity with a prolific integration algorithm. *Optik*, 220:165121, 2020.

[2] Yıldırım Y., Biswas A., Jawad A. J. M., Ekici M., Zhou Q., Khan S., Alzahrani A. K., and Belic M. R. Cubic-quartic optical solitons in birefringent fibers with four forms of nonlinear refractive index by exp-function expansion. *Results in Physics*, 16:102913, 2020.

[3] Al-Ghafri K. and Krishnan E. Optical solitons in metamaterials dominated by anti-cubic nonlinearity and hamiltonian perturbations. *International Journal of Applied and Computational Mathematics*, 6(5):144, 2020.

* *Corresponding Author's E-mail: khalil.alghafri@utas.edu.om*