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# Optical bright-dark and gaussian soliton with third order dispersion

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**Keywords:** Bright-dark soliton, Gaussian soliton, Thirring soliton, Perturbation, Ansatz.

## Abstract

This paper studies the combined bright-dark and optical gaussian soliton in nano fibers with the presence of group velocity dispersion, self-phase modulation and third order dispersion term. While the perturbation terms are included with coefficients of inter modal dispersion and self steeping term. The complex ansatz and Gaussian approaches are used to integrate the Schrödinger-Hirota equation. Consequently, the constraint conditions for the existence of the combined and Gaussian solution are listed. Some conserved quantities namely energy, linear momentum and Hamiltonian are also derived. Moreover, a brief discussion on thirring solitons is concluded as well.

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