

# Variational methods in fiber-optic communication systems

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## Abstract

In the last decade, two technologies of dispersion management (DM) and wavelength-division-multiplexing (WDM) have been proposed and developed to improve the performance of current fiber-optic communication systems significantly. However, the mathematical theory, when above situations are considered, has not yet been fully developed. In this presentation, we will try to solve the above-mentioned problems both analytically and numerically. We will present our most recent results in both aspects. More specifically, we will reduce the original partial differential equations (PDEs) models to a set of ordinary differential equations (ODEs) models by applying the variational principle. Furthermore, we will verify the results of variational methods by solving the PDEs models with a symmetrized split spectral methods.