1067-78-1464 **Patrice D. Benson*** (patrice.benson@usma.edu), USMA West Point, Mathematical Sciences Department, 646 Swift Road, West Point, NY 10996, and **Anjan Biswas**, **Dawn A. Lott** and **Daniala Milovic**. *Super-Sech Solitons in Optical Fibers via the Variational Principle.*

This research is the study of optical solitons via the variational principle and the relevance to the field of fiber optic communications. In particular, this problem explores the propagation of nonlinear information along an optical fiber by obtaining the evolution equations. The variational principle has been shown to be a very beneficial method since it can lay down the parameter dynamics of all the soliton parameters even if the governing equation is not integrable.

In the variational method the Lagrangian of the governing equation is constructed first. From Lagrangian, the Euler-Lagrange's (EL) equations are used to construct the parameter dynamics of the soliton parameters. In presence of perturbation terms, the modified version of EL equations are used to lay down the adiabatic parameter dynamics of optical solitons.

The pulse shape employed in this study was the super-sech function. Solitons in polarization preserving fibers, birefringent fibers, as well as in dense wavelength-division multiplexing systems were taken into consideration. The adiabatic parameter dynamics of soliton parameters were obtained in the presence of perturbation terms. The numerical simulations were performed to complete the analysis. (Received September 21, 2010)