1056-35-1559 **Dawn A. Lott*** (dlott@desu.edu), Delaware State University, Department of Mathematical Sciences, 1200 North DuPont Highway, Dover, DE 19901, **Auris Henriquez-Fernandez** (auris_hf@hotmail.com), University of Puerto Rico, Rio Piedras, PR, **Bryan Moore** (mooreb23@msu.edu), Michigan State University, East Lansing, MI, **Benjamin Sturdevant** (bsturdevant@wisc.edu), University of Wisconsin, Madison, WI , and **Anjan Biswas** (abiswas@desu.edu), Delaware State University, Dover, DE. *An Analytical and Numerical Study of Optical Soliton Propagation through Photorefractive Media governed by Logarithmic Law Nonlinearity.*

An analytical and numerical study of the Nonlinear Schrödinger's Equation (NLSE) with logarithmic law nonlinearity is performed. Optical soliton are stable wave solutions of the Nonlinear Schrödinger's Equation (NLSE). The focus of this work is the study of the NLSE with the log law nonlinearity. This type of nonlinearity models the propagation of a wave through a photorefractive media. Assuming a traveling wave ansatz, the NLSE is reduced to a second-order, ordinary differential equation (ODE). Stability conditions for this ODE are obtained by performing a linear stability analysis about its critical points. Given specific initial conditions for a Gaussian, the ODE is solved numerically by applying the fifth-order Runge-Kutta Fehlberg method. The final result, the solution of the NLSE with Gaussian ansatz is obtained. The evolution of the pulse is presented in three dimensions. (Received September 22, 2009)