

**Meeting:** 1001, Evanston, Illinois, SS 14A, Special Session on Nonlinear Waves

1001-35-279      **John P. Albert\*** (jalbert@ou.edu), Department of Mathematics, 601 Elm Ave., Rm. 423,  
University of Oklahoma, Norman, OK 73019, and **Jerry L. Bona** and **Nghiem V. Nguyen**. *On  
the variational characterization of KdV multi-solitons*. Preliminary report.

It has been known since the work of Lax in the 1960's that each KdV multi-soliton is a stationary point for a variational problem in which one conserved integral of the KdV equation is minimized while other conserved integrals are held constant. In their investigation of the stability of KdV multi-solitons, Maddocks and Sachs have shown that multi-solitons are not just stationary points but are in fact local minimizers for their associated variational problems. Here we study the associated variational problems further. We show that multi-solitons are also global minimizers, that the only global minimizers (or stationary points of any kind) are multi-solitons, and that each minimizing sequence for such a variational problem must converge strongly to the set of global minimizers. The proof involves analyzing concentration functions, as in Lions' method of concentration compactness. However, standard arguments cannot be used here, since in these variational problems minimizing sequences will, in general, exhibit the phenomenon of dichotomy. (Received August 29, 2004)