1035-49-219   **Mohsen Razzaghi*** (`razzaghi@math.msstate.edu`), Department of Mathematics and Statistics, Mississippi State University, Mississippi State, MS 39762. *Hybrid Functios Approach for the Solution of Nonlinear Problems in the Calculus of Variations.*

The available sets of orthogonal functions can be divided into three classes. The first includes set of piecewise constant basis functions (e.g., Walsh, block-pulse, etc.). The second consists of set of orthogonal polynomials (e.g., Laguerre, Legendre, Chebyshev, etc.). The third is the widely used set of sine-cosine functions in Fourier series. While orthogonal polynomials and sine-cosine functions together form a class of continuous basis functions, piecewise constant basis functions have inherent discontinuities or jumps.

In this work, we present a new approach to the solution of nonlinear problems in the calculus of variations. Our approach is based upon hybrid functions, which are combinations of block-pulse functions and Legendre polynomials. Numerical examples are included to demonstrate the applicability and the accuracy of the proposed method. (Received August 20, 2007)