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Mohsen Razzaghi* (razzaghi@math.msstate.edu), Mississippi State University, Mississippi State, MS 39762. *An approximate method for solving variational problems.*

Orthogonal functions may be widely classified into three families. The first includes sets of piecewise constant basis functions (PCBFs), (e.g., block-pulse, Haar, etc.). The second consists of sets of orthogonal polynomials (e.g., Chebyshev, Legendre, etc.). The third are widely used sets of sine-cosine functions in the Fourier series. While orthogonal polynomials and sine-cosine functions together form a class of continuous basis functions, PCBFs have discontinuities or jumps. For several problems in science and engineering, images often have properties that vary continuously in some regions and discontinuously in others. In recent years, the hybrid functions consisting of the combination of block-pulse functions with orthogonal polynomials have been shown to be a mathematical power tool for discretization of selected problems. In this talk, the hybrid of block-pulse and Legendre polynomials is used to find the numerical solution of variational problems. Numerical examples are included to demonstrate the validity and applicability of the proposed method and comparison is made with existing results. (Received September 14, 2018)