

DEPARTMENT OF MATHEMATICS AND STATISTICS
MISSISSIPPI STATE UNIVERSITY

COLLOQUIUM

Solution of Dynamical Systems by Hybrid Functions and Legendre Wavelets

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Monday, February 5, 2006 at 4:00 pm

Allen 14

Abstract: The available sets of orthogonal functions can be divided into three classes. The first class includes sets of piecewise constant basis functions (PCBF). The second class consists of sets of orthogonal polynomials. The third class is the set of sine-cosine functions in the Fourier series. While orthogonal polynomials and sine-cosine functions together form a class of continuous basis functions, PCBF's have discontinuities or jumps. If a continuous function is approximated by piecewise constant basis functions, the resulting approximation is piecewise constant. On the other hand if a discontinuous function is approximated by continuous basis functions, the discontinuities are not properly modeled. Signals in dynamical systems frequently have mixed features of continuity and jumps. In such situations, neither the continuous basis functions nor PCBF's taken alone would form an efficient basis for the representation of such signals. For these situations, hybrid functions which are the combinations of piecewise and continuous basis functions and wavelets, will be more effective.

In this talk, we describe the basic properties of the hybrid functions and Legendre wavelets required for our subsequent development. Numerical examples are included to demonstrate the applicability and the accuracy of the proposed methods and a comparison is made with the existing results.

Dr. Razzaghi is a candidate for our Department Head position.
There will be a reception at 3:00 in Allen 467.