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A Module for the Construction of Scaling Functions using the Cascade Algorithm.

Solving a dilation equation is fundamental in wavelet theory and applications, for the scaling function solution leads to wavelets. There is usually no closed-form solution to dilation equations, and the iterative cascade algorithm must be implemented to obtain good approximations to the scaling function. In this talk we discuss developing a student project exploring these issues.

While it is easy to write a module that implements the cascade algorithm using piecewise defined functions in the continuous setting, such a module proves to be remarkably slow for even a handful of iterations. In this talk, a module implementing the cascade algorithm in a much more efficient vector-form version will be developed and suggestions for how to get students to develop their own modules will be discussed. (Received September 21, 2009)