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Song-Tao Liu* (sliu07@syr.edu), Department of Mathematics, Syracuse University, 215 Carnegie Hall, Syracuse, NY 13244-1150. *Adaptive Approximation and Stable Wavelets on Nonuniform Meshes.*

In the first part of the talk, we consider the adaptive approximation on the basis of some norm equivalences and inequalities for different norms in Besov spaces. We will show that the best N terms approximation with wavelet like basis in Sobolev spaces exhibits the proper approximation order in terms of N^{-1} . This indicates that the computation load in adaptive approximation is proportional to the approximation accuracy. To seek such wavelet like bases, in the second part of the talk, we illustrate the construction of a type of wavelets on nonuniform meshes. These wavelets have the following properties: they are stable wavelet bases from piecewise quadratic functions for certain Sobolev spaces; they have small supports with 4 or 6 non-zero coefficients on non-uniform meshes; they are applicable to numerical solutions of elliptic problems with a higher order of convergence than that of piecewise linear wavelets. (Received August 23, 2005)