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**Bin Han\*** (bhan@math.ualberta.ca), Dept of Mathematical and Statistical Sciences, University of Alberta, Edmonton, Alberta T6G 2G1, Canada. *Characterization of MRA Riesz Wavelet Bases and Exponential Decay of Refinable Functions*. Preliminary report.

In this talk, we shall study dyadic Riesz wavelet bases derived from refinable functions via the multiresolution analysis. Let  $\phi$  be a refinable function in  $L_2(\mathbb{R})$  satisfying the refinement equation  $\hat{\phi}(2\xi) = \hat{a}(\xi)\hat{\phi}(\xi)$  for some  $2\pi$ -periodic measurable function  $\hat{a}$ . Let  $\hat{b}$  be a  $2\pi$ -periodic measurable function and define a wavelet function  $\psi$  by  $\hat{\psi}(2\xi) := \hat{b}(\xi)\hat{\phi}(\xi)$ . We say that  $\psi$  generates a Riesz wavelet basis in  $L_2(\mathbb{R})$  if  $\{\psi_{j,k} := 2^{j/2}\psi(2^j \cdot -k) : j, k \in \mathbb{Z}\}$  is a Riesz basis in  $L_2(\mathbb{R})$ . In this talk, we shall present a necessary and sufficient condition for  $\psi$  generating a Riesz wavelet basis in  $L_2(\mathbb{R})$ . Our characterization is based on the convergence of cascade algorithms in a subspace of  $L_2(\mathbb{R})$  and some properties of the transition operators. Some examples of Riesz wavelets will be given to illustrate the general theory. As a byproduct, we shall also discuss the exponential decay of a refinable function in  $L_2(\mathbb{R})$  when the mask  $\hat{a}$  has exponential decay. Joint work with Rong-Qing Jia. (Received August 30, 2005)