1023-42-1615 **Kenneth R. Hoover*** (khoover@uoregon.edu), Department of Mathematics, University of Oregon, Eugene, OR 97403. *The Dimension Function Of A Rationally Dilated Wavelet Associated With A GMRA.*

For a wavelet $\Psi = \{\psi^1, \ldots, \psi^L\}$ in $\mathbb{R}^N$ associated with an integer dilation A, we know that its dimension function $\mathfrak{D}_\Psi$ is given by

$$\mathfrak{D}_\Psi(\xi) = \sum_{l=1}^{L} \sum_{j=1}^{\infty} \sum_{k \in \mathbb{Z}^N} |\hat{\psi}^l((A^T)^j(\xi + k))|^2$$

However, this is generally insufficient for the case when A is a rational dilation. For this case, we intend to show that if Ψ is associated with a GMRA (that is, the space of negative dilates of Ψ forms the core space of a generalized multiresolution analysis with dilation A) then its dimension function is given by

$$\mathfrak{D}_\Psi(\xi) = \sum_{l=1}^{L} \sum_{j=1}^{\infty} \sum_{k \in \mathbb{Z}^N} |\hat{\psi}^l((A^T)^j(\xi + \tilde{B}k))|^2$$

where $\tilde{B}$ is such that $A^T \tilde{B} \mathbb{Z}^N = A^T \mathbb{Z}^N \cap \mathbb{Z}^N$. (Received September 26, 2006)