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Wang-Q Lim* (wq1206@lehigh.edu), Department of Mathematics, Lehigh University, Christmas-Saucon Hall, 14 E. Packer Ave., Bethlehem, PA 18015. *The Construction of Compactly Supported Shearlet Frames*. Preliminary report.

It is well-known that wavelets do not perform as well in dimensions larger than one. This situation is illustrated, for example, by the problem of approximating a function of two variables containing a discontinuity along a curve. In general, the singularity of a multi-dimensional function along a curve can not be detected by wavelet basis in an efficient way. This limitation has stimulated an active research in the construction of representation elements distributed not only at various scales and locations but also at various directions. In this talk, I will introduce affine-like system having exactly these properties and obtained by applying translations, dilations, and shear transformation to finitely many generating functions. The representation elements in the system are called shearlets. In fact, one can construct compactly supported shearlets which generate a frame and thanks to a generalized MRA structure of the system, fast implementation for computing shearlet coefficients can be obtained. This is simply convolution with specific time varying filters followed by anisotropic separable wavelet transform. I will show simple examples of compactly supported shearlet frames and talk about the fast numerical implementations of the shearlet frames and some applications. (Received September 11, 2007)