1077-41-1107   **Youngmi Hur** and **Fang Zheng*** (`fzheng2@jhu.edu`), 100 Whitehead Hall, 3400 N Charles St., Baltimore, MD 21218. *Coset sum: an alternative to the tensor product in wavelet construction.*

A wavelet system is a collection of functions, which are generated from a set of functions known as *mother wavelets* by scaling and translation. It is a set of building blocks to represent signals or functions, and has proven to be very efficient in many application areas including Signal Processing. While much work has been done to construct 1-D wavelets, less focus has been given to multidimensional ones. The most prevailing and generic way to construct multidimensional wavelets is by taking the tensor product of 1-D wavelets, which is called the tensor product method. Despite of its simplicity and popularity, it has many drawbacks: the wavelets constructed by the tensor product are directional only along the coordinate directions; the supports of multidimensional wavelets are huge. We will talk about an alternative of tensor product, called the coset sum method, that overcomes these drawbacks and is still generic. This new method lifts 1-D wavelets to n-D ones by taking their summation over coset representatives of the quotient group $\mathbf{Z}^n/(2\mathbf{Z})^n$, where 2 is the scaling ratio in the wavelet system. We will also talk about an extension to other integer scaling ratios. (Received September 16, 2011)