Symmetry Properties of Multivariate Refinable Functions

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Symmetry of a wavelet system is a much desired property in many applications such as subdivision surfaces and image compression. In this talk, we shall investigate the symmetry properties of a multivariate refinable function with a general dilation matrix. By taking into account of symmetry, we shall demonstrate that the computation of the Sobolev smoothness exponent of a symmetric refinable function with a dilation matrix can be made very efficient. A simple algorithm to compute the Sobolev smoothness of symmetric multivariate refinable functions will be presented. Examples of quincunx refinable functions (4-8 subdivision) and $\sqrt{3}$-subdivision schemes will be given to demonstrate the advantages of our algorithms. Finally, symmetric multivariate Hermite refinable functions will be discussed. Related papers can be downloaded at http://www.ualberta.ca/ bhan