

A Class of Fractional Refinable Functions

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Abstract

Starting from a family of centrally symmetric, totally positive and compactly supported (GP) refinable functions and introducing a fractional exponent α in the discrete Fourier transform, new functions, that are proved to be still refinable, are generated. Even if, for non integer α , they are not compactly supported anymore they exhibit a decay that allows them to belong to $L^2(\mathbb{R})$; moreover, for certain values of their parameters they reduce to the fractional B-splines, while, for integer α , they interpolate the GP refinable functions. Also, these refinable functions can be characterized by a convolution relation between suitable minimally supported GP refinable functions and suitable fractional B-splines.