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IMAGE MASKING WITH 2-D FRACTIONAL FOURIER TRANSFORM WINDOWS

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Abstract

The widespread use of ordinary Fourier transform in science and engineering, it is important to recognize this integral transform as the fractional power of FT. Indeed, it has been this recognition, which has inspired most of the many recent applications replacing the ordinary FT with FrFT (which is more general and includes FT as special case) adding an additional degree of freedom to problem, represented by the fraction or order parameter a. This in turn may allow either a more general formulation of the problem or improvement based on possibility of optimizing over a (as in optimal wiener filter resulting in smaller mean square error at practically no additional cost). The FrFT has been found to have several applications in the areas of optics and signal processing and it also lead to generalization of notion of time (or space) and frequency domains which are central concepts of signal processing. In every area where FT and frequency domain concepts are used, there exists the potential for generalization and implementation by using FrFT. Window functions have been successfully used in various areas of filtering, beam forming, signal processing and communication and image processing. The role of windows is quite impressive and economical from the point of view of computational complexity and ease associated with its application. An attempt has been made to evaluate the 2-D window functions in FrFT domain, for different windows like Rectangular, Triangular, and Hamming etc. The proposed paper gives on analysis of FrFT 2-D windows with FT 2-D windows in terms of peak signal to noise ratio (PSNR) of an image.

Keywords: 2-D windows, Fractional Fourier Transform.