FOURIER ANALYSIS TO WAVELET ANALYSIS

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Dedicated to Prof. M.A. Pathan on his 75th birth anniversary

Abstract: From a very modest presentation as an introductory composition of wavelets by Chui in 1992 to a very specialist and advanced monographs by Meyer in 1990, and by Daubechies in 1992, one will certainly experience the beauty of this subject, which in the recent time has attracted both the pure and applied mathematicians. *Wavelet transform*, more correctly called the *integral wavelet transform*, is one of the two entities of the wavelet analysis. Possibly the *window Fourier transform*, also called the Gabor transform (first introduced by Gabor in 1946), is the initiation for wavelet transform. In this brief note we attempt to discuss some of its aspects.

Keywords: Wavelet transform, Fourier transform, Gabor transform, Multiresolution analysis, Wavelet series, Fourier series, General distributions, Tempered distributions.

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1. Introduction

Wavelets stand at the intersection of the frontiers of mathematics, scientific computing and signal and image processing. It has been one of the major research direction in science in the last decade and is still undergoing rapid growth. Wavelet is a versatile tool in very aspect of mathematical context and possesses great potential for applications owing to viewing it as a new basis for *representing functions.* Some consider it as a technique for time frequency analysis and others think of it as a new mathematical subject. Wavelet analysis provides another fascinating interface between physics and mathematics. It were more instrumental in the explosive growth of the subject than were mathematical physicist.