PREFACE

The present dissertation entitled **"ON COMPUTATIONS WITH FOURIER AND WAVELET TRANSFORMS"** attempts to discuss the concept of Fourier transform, the Discrete Fourier transform, the Fast Fourier transform and introduction to the Discrete wavelet transform.

The dissertation contains in all five chapters. In chapter-0, we have given preliminary results, basic definitions and some useful properties of Fourier transform of a function which are subsequently used in the dissertation.

Chapter-1, includes the convolution and correlation properties, the relation between convolution and correlation with example. The important theorems like Parseval's theorem, convolution theorem are discussed. In the last concept of Fourier series and wavelet sampling are developed in terms of Fourier transform theory.

In chapter-2, we start with a development of a special case of the continuous Fourier transform which is amenable to machine computation. The approach will be to develop the discrete Fourier transform from a graphical derivation based on continuous Fourier transform theory followed by theoretical development. The approximation to the Fourier transform by

means of discrete Fourier transform is discussed at the end of the chapter.

Fast Fourier transform (FFT) is a particular method of performing a series of computations that can compute the discrete Fourier transform much more rapidly than other available algorithm. This is included in chapter-3. A simple matrix factoring example is used to intuitively justify the FFT algorithm. The factored matrices are alternatively represented by signal flow graphs. This is described with the help of figures. In the last the Sandey-Tukey algorithm and Cooley-Tukey algorithms are discussed theoretically.

Chapter-4, concerned with a type of wavelet representation that has assumed considerable practical significance. We take the approach developing the underlying ideas entirely through an example involving the Haar wavelet.