Preface

The thesis consists seven chapters beginning with the introduction as **Chapter 1**, which contains definitions of integral transforms like Fourier transform, wavelet transform, Hankel transform, Bessel wavelet transform and their important properties.

In **Chapter 2**, the relation between Bessel wavelet convolution product and Hankel convolution product is obtained by using the Bessel wavelet transform and the Hankel transform and found certain approximation results of Bessel wavelet transform. The heuristic treatment of the Bessel wavelet transform is given.

In **Chapter 3**, the Bessel wavelet convolution and normalized Bessel wavelet transform are introduced and using the above tools, boundedness of the normalized Bessel wavelet transform on generalized Sobolev space $B^{\mu}_{p,k}(0,\infty), 1 \leq p < \infty$ are proven. Other properties related to the Bessel wavelet transform are discussed.

In **Chapter 4**, sufficient conditions for the integrability of the kernel of inverse Bessel wavelet transform and their properties are provided by using the theory of Hankel transform and Hankel convolution.

In **Chapter 5**, we introduce the concept of linear time invariant filter and its properties with the help of Hankel transform. Further, we show that the linear time invariant filter can be expressed as the Bessel wavelet transform.

In **Chapter 6**, the Bessel wavelet transforms on $\chi_{\mu}(I)$ and $\mathcal{Q}_{\mu}(I)$ type spaces of exponential growth are investigated and their properties discussed by using the theory of the Hankel transform. Using the said theory, the integral equation of Fredholm type is studied and some examples associated with this integral equation are given.

In **Chapter 7**, Abelian theorems involving the Bessel wavelet transform are investigated and certain distributional results are discussed using the theory of Hankel transform.