PREFACE

Although wavelets have been around for only a few years, they have been a very popular topic of conversations in many Scientific and Engineering gatherings. Some of them considers, wavelets 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 .Of course, all of them are right, since wavelets is a versatile tool with very rich mathematical content and great potential for applications. Their popularity is largely due to the fact that they form bases for large classes of functions and in addition, they provide efficient representation for members of these classes, especially when the wavelets are orthonormal. But, unfortunately, almost all the known orthonormal wavelets except for Harr and Shannon wavelets cannot be expressed in closed form i.e. wavelets cannot be in general represented in terms of elementary functions such as trigonometric, exponential, rational functions or in terms of special functions such as gamma, Bessel or hypergeometric functions.

We have studied in the present dissertation a procedure for obtaining orthonormal wavelets and nonorthogonal, but interpolating wavelets and the

application of this procedure to specific cases to obtain a number of orthonormal wavelets and nonorthogonal but interpolating wavelets in closed form expressions.

The dissertation entitled '**Wavelets with simple closed form expressions** ' consists of three chapters.

Chapter 1 :

It is an introductory chapter in which we have given some definitions and preliminary results, which are essential for the theory of remaining chapters.

Chapter 2 :

It Consists of general procedure for constructing orthonormal wavelets as well as nonorthogonal but interpolating wavelets and the application of this procedure to obtain number of orthonormal wavelets in closed form.

Chapter 3 :

It is devoted to examples of nonorthogonal but interpolating wavelets. Ironically, as a by-product of this chapter, we obtain the orthonormal raised-cosine wavelets.

A triple numbering system is used for all Lemmas, Theorems and formulae. For example (2.3-1) denotes first formulae of third section in the second chapter. References are given at the end and are arranged in alphabetical order. In text, they have been referred to, by putting within a rectangular brackets the serial number of the reference that is [2, p.140] means page 140 of the second reference.