

MODULI OF CONTINUITY AND WILSON WAVELET APPROXIMATION OF SOLUTION FUNCTIONS OF FREDHOLM INTEGRAL EQUATIONS WITH BOUNDED M^{th} DERIVATIVES

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Abstract. Wilson wavelets have been discussed in this paper. An analysis has been conducted on the orthonormality property of Wilson wavelets. A verification has been done on the Wilson wavelet series of functions. The Wilson wavelet approximation of a function f whose M^{th} derivative $f^{(M)}$ belonging to Hölder's class of order $0 < \alpha \leq 1$ has been determined. The moduli of continuity has been estimated for solution function f of Fredholm integral equation. A method to solve integral equations by Wilson wavelet technique has been proposed. It is observed that the solutions of Fredholm integral equation obtained by the proposed method are almost same to their exact solutions. This illustrates the effectiveness of the proposed method.

1. Introduction

In recent years, wavelets have found their ways into different fields of science and engineering such as signal analysis for waveform representation, segmentation, image manipulation and numerical analysis[11]. In wavelet analysis, wavelet functions approximate a function with less nonzero wavelet coefficients in comparison to Fourier analysis. It studies the functions which are decomposed into basic functions and these are achieved by dilation and translation of mother wavelet.

In modern analysis, orthogonal functions and wavelets have been used to approximate a function by partial sums of its wavelet series. The main reason behind using orthogonal

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