Chebyshev Spectral Method for Volterra Integro-Differential Equations

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ABSTRACT

The present article is intended to present a spectral method for the numerical solution of linear Volterra integro-differential equations with boundary conditions of order two $-y''(x) + \alpha(x)y'(x) + \beta(x)y(x) = f(x) + \int_a^x K(x,t)\,y(t)dt, a \le t \le b, y(a) = y(b) = 0$. In this method first we convert the given problem into its discrete form using spectral element method. We use Chebyshev polynomial for interpolation. Numerical experiments are given to show the efficiency of the proposed method. Also, the error analysis is considered. The tabulation of error shows a good agreement between numerical and true solutions.

Keywords: Spectral method, Volterra Integro-Differential Equations, Chebyshev polynomial.

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