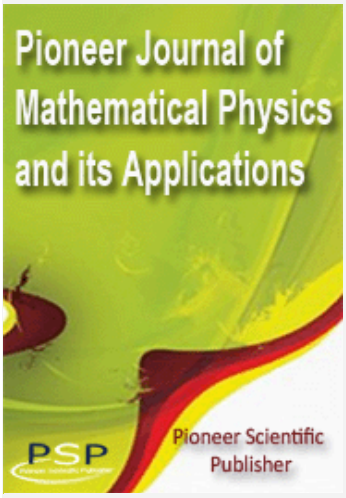
Pioneer Journal of Mathematical Physics and its Applications

Volume 2, Issues 1-2, Pages 7-15 (September & December 2012)

ISSN : 2277-8799



A NEW METHOD FOR SOLUTIONS OF DIFFERENTIAL EQUATION BY FAST FOURIER TRANSFORM

H. Arabshahi and G. R. Ebrahimi

Received December 31, 2010

Abstract

A new numerical method has been carried out to solve the differential equation using fast Fourier transform (FFT). The new algorithm has been accompanied by a numerical example. First, we solve a Cauchy problem for an elastic vibrating system, using the finite difference method. Then, with the values of the approximate solution obtained in the equidistant points from the interval [0, 1], we shall find an interpolation polynomial using FFT. Also, we study the approximation of the numerical solution and stability of the difference scheme, which correspond of a second-order differential equation.

Keywords and phrases: numerical method, Fourier transform, Cauchy problem, equidistant points.