



Numerical Solution of Fractional Hopfield Neural Networks Using Reproducing Kernel Hilbert Space Method

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Abstract: Artificial neural networks (ANN) consist of a group of the virtual neurons that are designed by computerized programs which use a variety of mathematical fractional equations. In this paper, we introduce the Reproducing Kernel Hilbert Space (RKHS) method for solving some certain fractional differential systems in the artificial neural networks field, which is the Hopfield network, using the conformable derivative.

Keywords: *Reproducing Kernel Hilbert Space Method (RKHSM), fractional derivative, artificial neural networks, differential systems, chaotic attractors.*

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1 Introduction

Artificial Neural Networks (ANN) is a recently emerging powerful computer-aided design (CAD) technology for modeling devices and circuits. These networks consist of a set of virtual neurons that are generated by computer programs that use a number of fractional mathematical equations to process the data that come from the neurons. The Hopfield network is a variety of recurrent artificial neural networks. Its idea arose from the behavior of particles in a magnetic field such that each particle is communicated (completely linked) with another particle by magnetic forces. This is referred to as activation in the

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