ARTIFICIAL NEURAL NETWORK METHOD FOR SOLVING FRACTIONAL FREDHOLM INTEGRAL EQUATIONS

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Abstract

For the last decade, several authors demonstrated the performance of artificial neural network models over other traditional testing methods[1, 2]. The current research, aimed to present a global optimization technique based on combination of neural networks approach and power series method for the numerical solution of a fractional Fredholm type integro-differential equation involving the Caputo derivative. The mentioned problem to be solved approximately for the unknown series coefficient via a three-layer feed-forward neural architecture. In other words, an accurate truncated power series representation of the solution function is achieved when a suitable learning algorithm is used for the suggested neural architecture. As applications of the present iterative approach, some kinds of integral equations are investigated. The achieved simulations are compared with the results obtained by some existing algorithms.

Keywords: Fractional Fredholm equation; Generalized power series expansion; ANNs approach; Caputo fractional derivative; Approximate solution.

References

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