Convergence properties of numerical solutions for nonlinear integro-differential equations.

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Abstract

We are concerned with iterative schemes for the numerical integration of nonlinear Volterra integro-differential equations applied in neuroscience. We introduce numerical algorithms which can be easily implemented in parallel computing environments and efficiently applied to conduct fast numerical simulations. We analyze the errors of the approximate solutions and derive error bounds that show their convergence to the exact solutions of general dynamical systems. The theoretical results validate that the numerical simulations produce reliable solutions.

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