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An operational matrix method for solving a class of nonlinear Volterra integro-differential equations by operational matrix method. (English) Zbl 1397.65317

Summary: In this paper, the improved Chebyshev operational matrix method is proposed to solve a class of nonlinear Volterra integro-differential equation. The main characteristic behind this approach is that it reduces such problems to ones of solving systems of algebraic equations. Some examples are included to demonstrate the validity and applicability of the this technique. The only a small number of shifted Chebyshev polynomials is needed to obtain a satisfactory result.

MSC:
65R20 Numerical methods for integral equations
45G10 Other nonlinear integral equations
33C50 Orthogonal polynomials and functions in several variables expressible in terms of special functions in one variable
65L60 Finite element, Rayleigh-Ritz, Galerkin and collocation methods for ordinary differential equations
45J05 Integro-ordinary differential equations
45D05 Volterra integral equations

Keywords:
nonlinear Volterra integro-differential equations; Chebyshev polynomials; operational matrix method; approximation method; numerical algorithm

Full Text: DOI

References:


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