Sedaghat, S.; Ordokhani, Y.; Dehghan, Mehdi
Numerical solution of the delay differential equations of pantograph type via Chebyshev polynomials.  (English) Zbl 1266.65115

Summary: We propose a numerical scheme to solve the pantograph equation. The method consists of expanding the required approximate solution as the elements of the shifted Chebyshev polynomials. The Chebyshev pantograph operational matrix is introduced. The operational matrices of pantograph, derivative and product are utilized to reduce the problem to a set of algebraic equations. An error analysis is presented which allows the number of polynomials employed in the approximation to be selected in advance for a desired tolerance. Some examples are given to demonstrate the validity and applicability of the new method and a comparison is made with the existing results.

MSC:
65L03 Numerical methods for functional-differential equations
65L70 Error bounds for numerical methods for ordinary differential equations

Keywords:
pantograph equation; Chebyshev polynomials; pantograph operational matrix; delay differential equation; numerical examples; error analysis

Full Text: DOI

References:

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