

Liu, G. R.; Wu, T. Y.

Numerical solution for differential equations of Duffing-type non-linearity using the generalized differential quadrature rule. (English) Zbl 1237.65073

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Summary: The generalized differential quadrature rule (GDQR) proposed recently by the authors is applied for the first time to second and fourth order initial-value differential equations with Duffing-type non-linearity. Procedures are given in detail to convert these non-linear differential equations into a set of linear algebraic equations in an iterative loop using the Frechet derivative. The effectiveness of the GDQR for obtaining the periodic solution of the Duffing equation has been demonstrated through a number of examples. It is also shown that the use of the Frechet derivative makes it easier for the GDQR to handle non-linearity. The wide applicability of the GDQR is manifested further through this work.

MSC:

- 65L06** Multistep, Runge-Kutta and extrapolation methods for ordinary differential equations
- 65D30** Numerical integration
- 34C15** Nonlinear oscillations and coupled oscillators for ordinary differential equations

Cited in **9** Documents

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