

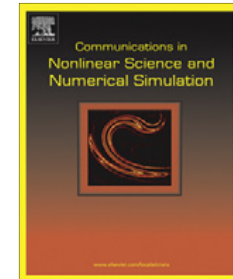


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# A Jacobi–Gauss collocation method for solving nonlinear Lane–Emden type equations

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### ABSTRACT

In this paper, a shifted Jacobi–Gauss collocation spectral method is proposed for solving the nonlinear Lane–Emden type equation. The spatial approximation is based on shifted Jacobi polynomials  $P_{T,n}^{(\alpha,\beta)}(x)$  with  $\alpha, \beta \in (-1, \infty)$ ,  $T > 0$ , and  $n$  is the polynomial degree. The shifted Jacobi–Gauss points are used as collocation nodes. Numerical examples are included to demonstrate the validity and applicability of the technique and a comparison is made with existing results. The method is easy to implement and yields very accurate results.

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