عنوان مقاله:

A new reproducing kernel method for solving the second order partial differential equation

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خلاصه مقاله:

In this study, a reproducing kernel Hilbert space method with the Chebyshev function is proposed for approximating solutions of a second-order linear partial differential equation under nonhomogeneous initial conditions. Based on reproducing kernel theory, reproducing kernel functions with a polynomial form will be erected in the reproducing kernel spaces spanned by the shifted Chebyshev polynomials. The exact solution is given by reproducing kernel functions in a series expansion form, the approximation solution is expressed by an n-term summation of reproducing kernel functions. This approximation converges to the exact solution of the partial differential equation when a sufficient number of terms are included. Convergence analysis of the proposed technique is theoretically investigated. This approach is successfully used for solving partial differential equations with nonhomogeneous boundary conditions.

کلمات کلیدی:

Reproducing kernel Hilbert space method, shifted Chebyshev polynomials, Convergence analysis, Second order linear partial differential equation

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