

Numerical method for simultaneous determination of the right-hand side and the lowest coefficient in parabolic equation

LingDe Su

Abstract

We propose a numerical scheme to solve the inverse problem of determining two lower coefficients that depends on time only in the parabolic equation. The time dependence of the right-hand side of a parabolic equation is determined using additional solution values at points of the computational domain. For solving the inverse problem, linearized approximations in time are constructed using standard finite difference procedures in space. The results of numerical experiments are presented, confirming the capabilities of the proposed computational algorithms for solving the coefficients inverse problem.

Key words: inverse problem, finite difference method, parabolic partial differential equation, identification of the coefficients

References

1. *M. Dehghan*. An inverse problem of finding a source parameter in a semilinear parabolic equation. // Applied Mathematical Modelling, vol. 25, no. 9, pp. 743-754, 2001.
1. *T. F. Chan, X. C. Tai*. Level Set And Total Variation Regularization For Elliptic Inverse Problems With Discontinuous Coefficients. // J. Comput. Phys, vol. 193, no. 1, pp. 40-66, 2004.
3. *P. N. Vabishchevicha, V. I. Vasil'ev, and M. V. Vasil'eva*. Computational Identification of the Right-Hand Side of a Parabolic Equation. // Computational Mathematics and Mathematical Physics, vol. 55, no. 9, pp. 1015-1021, 2015.