A simultaneous approach to inverse source problem by Green’s function

Arzu Erdem

Kocaeli University, Faculty of Arts and Sciences
Department of Mathematics, Umuttepe Campus,
41380, Kocaeli - TURKEY
E-mail: erdem.arzu@gmail.com

Abstract: In this paper we consider an inverse source problem of identification of $F(t)$ function in the linear parabolic equation $u_t = u_{xx} + F(t)$ and $u_0(x)$ function as the initial condition from the measured final data and local boundary data. Based on the optimal control framework by Green’s function, we construct Fréchet derivative of Tikhonov functional. The stability of the minimizer are established from the necessary condition. The Conjugate Gradient algorithm based on the Fréchet derivative is applied to the inverse problem and results are presented for various test examples.

Keywords: Inverse source problem, parabolic problem, adjoint problem, conjugate gradient method, Green’s function

REFERENCES

[7] Choulli M., Yamamoto M., Uniqueness and stability in determining the heat radiative coefficient, the initial temperature and a boundary coefficient in a parabolic equation, Nonlinear Analysis, 69(2008), 39833998.