

A conjugate gradient method based on the complex-variable-differentiation method and its application for the identification of boundary conditions

***Miao Cui, Weiwei Duan, Xiaowei Gao**

State Key Laboratory of Structural Analysis for Industrial Equipment, School of Aeronautics and Astronautics, Dalian University of Technology, Dalian 116024, China

*Corresponding author: miaocui@dlut.edu.cn

Abstract: The conventional conjugate gradient method is improved to utilize its advantage of high accuracy and fast convergence, and to avoid the complicated differentiating and derivation processes for solving nonlinear inverse heat conduction problems. In the present work, the complex-variable-differentiation method is introduced into the conventional conjugate gradient method, which is employed to precisely calculate the sensitivity coefficients. Transient nonlinear inverse heat conduction problems are solved, and then the boundary conditions are identified. Numerical examples are given to show the effectiveness and high accuracy. Compared with the conventional conjugate gradient method, the present algorithm has the advantage of easier implementation and higher accuracy.

Keywords: conjugate gradient method; complex-variable-differentiation method; boundary condition; identification

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