

Numerical Solution of Inverse Heat Conduction Problems in Two Spatial Dimensions

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Abstract

Inverse Heat Conduction Problems (IHCPs) have been extensively studied over the last 50 years. They have numerous applications in many branches of science and technology. The problem consists in determining the temperature and heat flux at inaccessible parts of the boundary of a 2- or 3-dimensional body from corresponding data – called 'Cauchy data' – on accessible parts of the boundary. It is well-known that IHCPs are severely illposed which means that small perturbations in the data may cause extremely large errors in the solution.

In this contribution we first present the problem and show examples of calculations for 2-dimensional IHCP's where the direct problems are solved with the Finite Element package DEAL. As solution procedure we use Tikhonov's regularization in combination with the conjugate gradient method.