

The Method of Fundamental Solutions for Solving the Backward Heat Conduction Problem with Conditioning by a New Post-Conditioner

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**Abstract**

We consider a backward heat conduction problem (BHCP) in a slab, by subjecting to noisy data at a final time. The BHCP is known to be highly ill-posed. In order to stably and numerically solve the BHCP, we employ a new post-conditioner to reduce the condition number of the resulting linear system obtained from the method of fundamental solutions. The present method can retrieve very well the initial data with a high order accuracy. Several numerical examples of the BHCP demonstrate that the present method is applicable, even for those of strongly ill-posed ones with a large value of final time.

Keywords: Inverse problem, Backward heat conduction problem, Strongly ill-posed problem, Post-Conditioner.