

Reconstruction of moving boundary of a multilayer composite wall as a heat conduction media

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In this paper, we develop a meshless procedure to solve an inhomogeneous heat transfer problem across a multilayer composite wall. It is considered that the inner layer may be varying, and we propose an inverse procedure to identify the moving boundary using the Cauchy data. The corresponding forward numerical model is a numerical method based on radial basis functions in both time and space in a unified fashion. To adjust the shape parameter c in the RBF used in each layer, we develop an adaptable procedure that minimizes the error on the known boundary. A single set of linear system of equations is constructed to avoid possible error accumulation. In order to mitigate the ill-posed inverse problem, we use Tikhonov regularization technique to obtain a stable and accurate numerical approximation. Intensive numerical experiments are presented to demonstrate that our inverse procedure is effective and stable with respect to noisy data.

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