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Space marching and discrete mollification for nonlinear diffusion coefficient identification *

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Abstract

The discrete mollification method is a convolution-based filtering procedure suitable for the regularization of ill-posed problems. Combined with explicit space-marching finite difference schemes, it provides stability and convergence for a variety of coefficient identification problems in linear parabolic equations. In this work we extend such a technique to identify some nonlinear diffusion coefficients depending on an unknown space dependent function in one dimensional parabolic models. For the coefficients recovery process we present detailed error estimates and to illustrate the performance of the algorithms, several numerical examples are included.

Key words: mollification, parameter identification, space marching

Mathematics subject classifications (2010): 65N21, 65N12, 65N06, 80A23

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