SEQUENTIAL APPROXIMATION TO NONLINEAR INVERSE HEAT CONDUCTION PROBLEMS [1]

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Abstract

Sequential approximations to the solution of nonlinear Inverse Heat Conduction Problems in one spatial dimension are analyzed. The problem is illposed and is also known as noncharacteristic Cauchy problem for nonlinear parabolic equations. The nonlinearity caused by a temperature dependent thermal diffusivity is linearized by freezing the temperature for certain steps in the sequential procedure known as the Beck method. In the analysis, a relation for the approximating heat fluxes showing the explicit dependence on the previous ones is proved. Moreover, an error analysis is established providing estimates for the errors in the surface heat fluxes and in the surface temperatures when the temperature data are perturbed.

[1] In: Mathl. Computer Modelling **20**(1994) No. 10/11, 189-200.