ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

15. Numerical Analysis and Scientific Computing

1991 MS Classification: 65M60, 80A32, 76V05

Schneider, Kai, ICT, Universität Karlsruhe, Germany

An Adaptive Wavelet Method for the Numerical Simulation of Two–dimensional Flame Balls

In the past we constructed an adaptive wavelet–vaguelette algorithm for the solution of nonlinear parabolic PDEs. The trial functions are orthogonal wavelets and the required testfunctions are defined such that the stiffness matrix turns out to be the identity. We dispose a fast transform between coefficient space and physical space, since the nonlinear reaction term has to be evaluated in the latter space.
We report on the application of the adaptive wavelet code to the numerical simulation of two–dimensional flame balls. The evolution of circular and elliptic flames was computed for several sets of parameters. We find repeated splitting of the flame ball which is studied in some detail, extinction after excessive growth, and also obtain quasi–stable flame balls.