On the Finite Difference Approximation for Parabolic Blow-Up Problems

Chien-Hong Cho

KYOTO UNIVERSITY, JAPAN cho1003jp@yahoo.co.jp

We consider $u_t = u_{xx} + f(u)$ $(0 \le t, 0 \le x \le 1)$ and its finite difference analogue, whose solutions blow up in finite time. We report our recent results on the convergence and asymptotic behavior of the finite difference solutions. In particular, we report some examples for which numerical reproduction of blow-up is next to impossible. Also, we report on our recent results on numerical blow-up of nonlinear wave equations.

This is a joint work with S. Hamada and H. Okamoto.