

A numerical algorithm for blow-up problems

Chien-Hong Cho

National Chung Cheng University, Chia-Yi 621, Taiwan.
E-mail: chcho20@ccu.edu.tw

Abstract

In many evolution equations, solutions may become unbounded in finite time. This phenomenon is often called blow-up and the finite time is called the blow-up time. To numerically reproduce the finite-time blow-up phenomenon, schemes with adaptive time meshes were considered to be necessary. Since the numerical blow-up time is defined by an infinite sum, which implies that one needs to compute infinite times to achieve blow-up, this method cannot be carried out in real computation. As a consequence, we propose an algorithm using schemes with uniform time meshes for the computation of blow-up solutions. In this talk, we are concerned with a question: to what extent can this algorithm be applied to compute the blow-up solutions and reproduce the blow-up behavior?