数学与系统科学研究院

计算数学所学术报告

(定期学术报告)

报告人： 钱莹博士 (ICMSEC)

报告题目：

Simulation Study on Dynamics and Damage of Brittle Material by Numerical Manifold Method

报告时间： 2008 年 10 月 15 日(周三)

下午 4:00—5:00

报告地点： 科技综合楼三层 311

计算数学所报告厅

Abstract：

As a new technique, the numerical manifold method is proposed in 1990s. The finite−covers of manifold can unify the mathematical description for

both continuous problems and discontinuous problems. This method takes the advantage of both the traditional finite element method (FEM) technique and the discontinuous deformation analysis method (DDA). In this seminar, based on the former study, a study on the stress wave propagation and reflection, the damage evolution of brittle materials like rocks under dynamic loading condition has been done based on the numerical manifold method (NMM), taking into consideration theoretic analysis integrated with experimental result. The main content of the seminar are listed as follows:

Firstly, I will introduce the basic concepts of numerical manifold method, including the finite–covers system, weight function and cover displacement function, governing equation and dynamic solving formulation, etc.

Secondly, the main results of my PHD dissertation will be presented: A new elastic constitutive model including attenuation factor is established.

The model can solve high frequency oscillation phenomena in simulation results.

The viscous and superposition boundary conditions of the numerical manifold method are introduced and discussed in simulation of stress wave propagation of the infinite domain. It is validated that the two kinds of boundaries have been absorbed lots of reflection waves by a simple example.

The compound constitutive model considering the stress wave attenuation damage is established on the basis of the original numerical manifold method program only including the elastic constitutive model. By means of the expanded program, the propagation process of stress wave is simulated, and the result perfectly re–shows the propagation process of the stress wave and the damage evolution trend of the material.

欢迎大家参加！