

# 臺灣大學數學系演講

## Inverse Problems Seminar

**演講者** : 吳金典 教授(交大應用數學系)

**講題** : **On the reconstruction of free-form surface and finite element approximation**

**時間** : 2011 年 11 月 30 日 (星期三) 14:20-15:20

**地點** : 臺灣大學天文數學館 305 室

**摘要** : Free form optical surface design problem can be formulated by a fully nonlinear partial differential equation (PDE) based on energy conservation principle. The nonlinear PDE is a general Monge-Ampere equation. Numerical methods such as finite difference methods proposed by Oberman etc Dean and Glowinski and finite element methods proposed by Feng and Neilan and Awanou have been successfully applied to solve the standard MA equation. In the first part of this talk, we introduce some of known theoretical results obtained by Caffarelli, Oliker, Mader and Wang etc., and the above mentioned numerical methods. We solve the MA equation using Feng and Neilan's vanished moment method. The linearized MA equation is approximated by the well-known BCIZ finite element method. Robust and accurate numerical solutions are obtained for many benchmark problems. In the second part of this talk, we shall introduce the free-form surface design problem and show that the nonlinearity can be reduced to a manageable degree by our finite element modeling and some assumptions of the local properties of the reconstructed surfaces. Our numerical results show that the free-form surfaces obtained from our reconstruction algorithm are accurate.

**主辦人** : 王振男 <http://www.math.ntu.edu.tw/~jnwang/ipseminar.htm>