

数学与系统科学研究院
计算数学所系列学术报告

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报告题目:

Some Problems in Numerical Linear Algebra

邀请人: 白中治研究员

报告时间: **2011 年 9 月 23 日 (周五)**

上午 9: 00-12: 00

报告地点: **科技综合楼三层 311**

计算数学所报告厅

Abstract:

In this series of lectures there are four “Themes” concerning some recent work on several different problems closely related to eigenvalue problems in numerical linear algebra.

Theme 3: The determination of eigenvalues near the imaginary axis

In many applications (eg, linearised stability of dynamical systems) it is important to find the eigenvalues near the imaginary axis as these determine possible nearby unstable states. This is a challenging problem when the matrices are large, as is the case when the matrices arise from discretised PDEs. We shall discuss some common methods and shall concentrate on one based on the “bi-alternate product” introduced by Guckenheimer, Gueron & Harris-Walker (Phil. Trans. R Soc London Ser B 341 (1993)pp. 345-359) for small scale systems.

We describe how this approach may be extended to produce a reliable method for large scale problems. Relevant papers are:

a) Meebergen & Spence, “Inverse iteration for purely imaginary eigenvalues with application to the detection of Hopf bifurcation in large scale problems”, SIAM J Matrix Anal. Appl. 31 (2010) pp.

92-113

b) Elman, Meerbergen, Spence & Wu, “Lyapunov inverse iteration for identifying Hopf bifurcations in models of incompressible flow”, (2011) submitted to SIAM J Scientific Computation

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