The Hong Kong Polytechnic University
Department of Applied Mathematics

Colloquium

On

On Maximum-Principles in Parabolic Finite Element Problems

by

Professor Vidar Thomee
Chalmers University of Technology
Sweden

Abstract

We consider piecewise linear finite element discretizations of the model initial-boundary value problem for the homogeneous heat equation, and discuss the validity of the associated discrete maximum-principles. We demonstrate that for the spatially semidiscrete standard Galerkin approximation, the maximum-principle is not valid in general, but, as was shown by Fujii in 1973, it holds for the lumped mass variant when the triangulation is of Delaunay type. We also observe that this condition on the triangulation is essentially sharp. Further we study conditions for the solution operator, acting on the discrete initial data, to be a contraction in the maximum-norm or to be a positive operator. Finally, we present some results for the simplest discrete time analogues of these approximations.

Date : **9 February, 2009 (Monday)**

Time : **3:00 – 4:00 p.m.**

Venue : **Departmental Conference Room HJ610**
The Hong Kong Polytechnic University

*** * * ALL ARE WELCOME * * ***