



# Applied Mathematics



## McGill & CRM Applied Mathematics Seminar

2:35 pm Monday 27 October 2003

At McGill, Burnside Hall 1205

“Adaptivity in the numerical solution of parabolic equations: the  $p$  version of the finite element method”

Javier de Frutos

Matemática Aplicada y Computación  
Universidad de Valladolid, Spain

*Coffee and refreshments will be served after the seminar*

**Abstract:** In this talk an a posteriori error estimator for nonlinear parabolic partial differential equations in several space dimensions is presented. The spatial discretization is carried out using the  $p$ -version of finite element method. The error estimator is obtained by solving an elliptic problem with the temporal variable frozen at the value at which the error estimation is wanted. We present some numerical experiments showing the efficiency of the procedure.

In the last part of the talk we present a procedure to localize the error estimator using the properties of the natural hierarchic bases of the  $p$ -finite element spaces. Thanks to the local procedure it is possible to estimate the errors frequently without increasing significantly the computational cost. The error estimator not only provides local bounds on the error but also can improve locally the numerical solution previously computed.

