



SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA.

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Título de la Charla:

DPG method for parabolic problems

Fecha y Hora:

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Lugar:

Sala Seminario, Facultad de Ciencias, Universidad del Bío-Bío, Concepción.

Resumen

In this talk, we will discuss time-stepping discontinuous Petrov-Galerkin (DPG) finite element approximation for parabolic problems. For the ease of presentation, we will start with the basic theoretical framework for a DPG method with optimal test functions for the heat equation and highlight some advantages of the method over the standard Galerkin one. We will also comment on some essential features like stability, convergence analysis and adaptivity related to standard Galerkin approximation for parabolic problems and mention their limitations to apply for a DPG method for such problems. For a time-stepping DPG method, we consider DPG approximation based on ultra-weak variational formulation in space and combine with the backward Euler time stepping scheme. We prove the stability of the method for the field variables (the original unknown and its gradient weighted by the square root of the time step) and derive a Céa-type error estimate. Extension of our results to treat more general linear parabolic problems will also be discussed. Some numerical results are presented to support our theoretical findings.