
SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

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Expositor:

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Título de la Charla:

***Mixed continuous and discontinuous Galerkin methods
for the time-harmonic elasticity problem.***

Fecha y Hora:

Martes 15 de Marzo de 2016, 15:30 Horas.

Lugar:

**Auditorio Alamiro Robledo, FCFM, Universidad de
Concepción.**

Resumen

The purpose of the talk is to present recent results [2] on the analysis of mixed continuous and discontinuous Galerkin discretizations of the indefinite elasticity problem. We formulate the problem in the traditional dual-mixed setting and impose weakly the symmetry of the Cauchy stress tensor. We take advantage of the recent spectral analysis obtained in [3] to prove that the continuous Galerkin approximation of the problem based on the Arnold-Falk-Winther element [1] is uniformly stable when the Lamé coefficient λ and the wave number κ tend to infinity and when the mesh size h goes to 0, provided that κ does not approach a countable set of singular values and provided h is sufficiently small. We also introduce a mixed interior penalty discontinuous Galerkin method and show that it enjoys similar stability properties. We derive for each scheme optimal a-priori error bounds in the energy norm. Finally, we report some numerical experiments illustrating the performance of the methods.

Referencias

- [1] D. N. ARNOLD, R. S. FALK, AND R. WINTHER, *Mixed finite element methods for linear elasticity with weakly imposed symmetry*, Math. Comp., **76** (2007), pp. 1699–1723.
- [2] A. MÁRQUEZ, S. MEDDAHI, T. TRAN, *Analyses of mixed continuous and discontinuous Galerkin methods for the time harmonic elasticity problem with reduced symmetry*. SIAM J. Sci. Comput., **73** (2015), pp. 1909–1933.
- [3] S. MEDDAHI, D. MORA, R. RODRÍGUEZ, *Finite element spectral analysis for the mixed formulation of the elasticity equations*. SIAM J. Numer. Anal., **51** (2013), pp. 1041–1063.