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## SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

GIMNAP-Departamento de Matemática, UBB  
Centro de Investigación en Ingeniería Matemática (CI<sup>2</sup>MA), UDEC

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*Título de la Charla:*

*Finite element analysis for a bending moment  
formulation for the vibration problem of a  
non-homogeneous Timoshenko beam*

**Fecha y Hora:**

**Martes 16 de Diciembre de 2014, 15:30 Horas.**

**Lugar:**

**Auditorio Alamiro Robledo, FCFM.**

**Universidad de Concepción.**

### **Resumen**

In this work we analyze a mixed finite element method for approximating the vibration frequencies and modes of a non-homogeneous Timoshenko beam. Optimal order error estimates are proved for displacements, rotations, shear stress and the bending moments of the vibration modes, as well as a double order of convergence for the vibration frequencies. These estimates are independent of the beam thickness, which lead to the conclusion that the method is locking free. Finally, we report numerical experiments which allow us to assess the performance of the method.