
SEMINARIO DE ANÁLISIS NUMÉRICO Y MODELACIÓN MATEMÁTICA

GIMNAP-Departamento de Matemática, UBB
Centro de Investigación en Ingeniería Matemática (CI²MA), UDEC

Expositora:

Ana Alonso-Rodríguez

Department of Mathematics, University of Trento, Italy

Título de la Charla:

***On the computation of the eigenvalues
of the curl operator***

Fecha y Hora:

Martes 15 de Diciembre de 2020, 15:30 Horas.

Lugar:

Seminario online

Plataforma Zoom

Resumen

We present a new algorithm for the finite element approximation of the eigenvalue problem for the **curl** operator in a multiply-connected domain Ω . If the domain is simply connected the **curl** operator is self-adjoint when restricted to the space of vector fields \mathbf{v} that satisfy the boundary condition $\operatorname{curl} \mathbf{v} \cdot \mathbf{n} = 0$. When Ω is not simply connected additional constraints must be imposed: a viable choice is the vanishing of the line integrals of \mathbf{v} on suitable homological cycles lying on the boundary. The new algorithm that we propose is based on the weak formulation and finite element approximation of this problem analyzed in A. Alonso *et al.*, *Found. Comput. Math.* (2018). The algorithm exploits the Hodge decomposition of the finite element space. To reduce the dimension of the generalized matrix eigenvalue problem it uses a tree-cotree decomposition of the graph relating the degrees of freedom of the Lagrangian finite elements and those of the first family of Nédélec finite elements. Some numerical experiments are presented to assess the performance of the method.