



Seminario de Estudiantes de Postgrado en Ingeniería Matemática

Sesión 2 – 2026

Martes 15 de septiembre, 12:30 horas, auditorio Hermann Alder Weller, CI²MA

Spectral Analysis of HDG Methods and Applications to Neural Operator-Based Local Solvers

Hybridizable Discontinuous Galerkin (HDG) methods rely on static condensation to drastically reduce globally coupled degrees of freedom. This seminar begins with a brief introduction to the HDG and hybridized mixed frameworks, followed by a rigorous spectral analysis of their statically condensed systems for second-order elliptic problems. Using novel local lifting operators and trace isometries, we establish sharp condition number estimates that explicitly capture the dependence on the mesh size h and polynomial degree k , proving an $\mathcal{O}(h^{-2}k^2)$ scaling. Finally, we bridge this theoretical foundation with machine learning-accelerated solvers. Relying on perturbation analysis of the condensed matrix, we discuss how neural network solvers can accelerate the resolution of parametrized local solvers without compromising global stability.

Manuel A. Sánchez Uribe

Instituto de Ingeniería Matemática y Computacional
Pontificia Universidad Católica de Chile



Universidad
de Concepción



Centro de Investigación en Ingeniería Matemática