

MINRES FOR SECOND-ORDER PDES WITH SINGULAR DATA

THOMAS FÜHRER*, NORBERT HEUER, MICHAEL KARKULIK

ABSTRACT

In this talk I present recent results on minimum residual methods (MINRES) for problems with singular data. Minimum residual methods such as the least-squares finite element method (FEM) or the discontinuous Petrov-Galerkin method with optimal test functions (DPG) usually exclude singular data, e.g., non square-integrable loads. We consider a DPG method and a least-squares FEM for the Poisson problem. For both methods we analyze regularization approaches that allow the use of singular load functionals, and also study the case of point loads. For all cases we prove appropriate convergence orders and present various numerical experiments that confirm our theoretical results.

REFERENCES

- [1] Führer, T., Heuer, N. and Karkulik, M., *MINRES for second-order PDEs with singular data*, SIAM J. Numer. Anal. 60 (2022), pp. 1111–1135.

* FACULTAD DE MATEMÁTICAS, PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE, TOFUHRER@MAT.UC.CL