

# LEAST SQUARES SOLVERS FOR CONDITIONALLY STABLE ILL-POSED PDES

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## ABSTRACT

This talk is concerned with the design and analysis of least squares solvers for ill-posed PDEs that are conditionally stable. The norms and the regularization term used in the least squares functional are determined by the ingredients of the conditional stability assumption. We are then able to establish a general error bound that, in view of the conditional stability assumption, is qualitatively the best possible, without assuming consistent data. The price for these advantages is to handle dual and/or fractional Sobolev norms. We present an approach that equally well applies to least-squares solvers for well-posed PDEs. The theoretical findings are illustrated by numerical experiments for the Poisson equation with Cauchy data, and data-assimilation problems for wave and heat equation.

## REFERENCES

- [1] Wolfgang Dahmen, Harald Monsuur, Rob Stevenson, *Least squares solvers for ill-posed PDEs that are conditionally stable*. July 2022, Submitted.

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