

# Heuristic Parameter Choice Rules with Operator Perturbations

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We present heuristic parameter choice rules and also propose a new class of *semi-heuristic* parameter choice rules for regularisation methods of linear ill-posed problems in the presence of data and operator perturbations.

A convergence theory for heuristic parameter choice rules in the absence of operator perturbations has already been established. A central ingredient is that a noise condition must be postulated in order for these methods to work which stipulate that the noise is sufficiently irregular. The standard heuristic rules may be inhibited, however, if the additional operator error is deterministic or smooth. The semi-heuristic rules therefore provide a possible remedy.

We prove that the heuristic and semi-heuristic parameter choice rules yield convergent regularisation methods and also provide error estimates. Moreover, we provide a numerical study and comparison of the aforementioned rules.

This was a joint work with Uno Hämarik and Urve Kangro of the University of Tartu and Stefan Kindermann, also of the Johannes Kepler University Linz.

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