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Regularized total least squares: computational aspects and error bounds

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ABSTRACT

For solving linear ill-posed problems regularization methods are required when the right hand side and the operator are with some noise. In the present paper regularized approximations are obtained by regularized total least squares and dual regularized total least squares. We discuss computational aspects and provide order optimal error bounds that characterize the accuracy of the regularized approximations. The results extend earlier results where the operator is exactly given. We also present some numerical experiments, which shed a light on the relationship between RTLS, dual RTLS and the standard Tikhonov regularization.

REFERENCES

[1] S. Lu, S.V. Pereverzyev and U. Tautenhahn, *RICAM Report*, 2007-30;
"Regularized total least squares: computational aspects and error bounds";
https://www.ricam.oeaw.ac.at/publications/reports/07/rep07-30.pdf.