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# NEW CONVERGENCE RESULTS OF PROXIMAL ALGORITHMS IN THE PRESENCE OF ADJOINT MISMATCH

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We consider the proximal gradient algorithm (PGA) for solving penalized least-squares minimization problems arising in data science. This first-order algorithm is attractive due to its flexibility and minimal memory requirements allowing to tackle large-scale minimization problems involving non-smooth penalties. PGA can be accelerated by preconditioning strategies. A challenging situation arises when linear operators involved in this algorithm are replaced by approximations, with the aim to reduce the overall computation burden. In this talk, we study the PGA, in the two following important cases of model mismatch:

- Unmatched PGA, where the forward linear operator and its adjoint, involved in the least-square gradient step, are distinct [1];
- Unmatched preconditioned PGA, where two distinct preconditioning metrics are used in the gradient step and the proximity step [2].

For both new iterative scheme, we provide convergence conditions and characterize its limit point. Simulations in the context of X-ray tomographic image reconstruction from undersampled measurements show the benefits of our approach.

## References

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[2] M. Savanier, E. Chouzenoux, J.-C. Pesquet and C. Riddel: *Unmatched Preconditioning of the Proximal Gradient Algorithm*, IEEE Signal Processing Letters, vol. 29, pp. 1122-1126, 2022.

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