

A survey of splitting methods for decomposing sums of maximal monotone operators

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Since early works by Brezis, Lions, Mercier and Cohen, operator splitting methods have become quite popular to decompose large optimization or variational inequalities problems. Many structured operations research models can be reformulated to be eligible for such decomposition techniques which are closed to separable versions of Augmented Lagrangian methods. We survey here most approaches, focussing on convex optimization models and on different application fields as varied as network design, stochastic models for production planning, location and routing problems, image reconstruction and multistage decision processes. We will emphasize the role of proximal regularization and show how superlinear convergence can be asymptotically expected even with complete lack of second order information.