

Inertial methods for monotone inclusions and applications in imaging

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Abstract: Convex optimization problems can be reformulated in various ways using duality and subgradients. Using duality, for example, one arrives at saddle point problems which in turn have an optimality system in the form of a monotone inclusion. Hence, it is of interest to have algorithms for this problem class. In this talk we introduce a forward-backward method for monotone inclusions where the operator can be split into a cocoercive part (for the forward step) and a part for which the resolvent is simple to evaluate (for the backward step). We show that the resulting method can be accelerated by means of inertial steps in the spirit of the heavy-ball-method and Nesterov's accelerated gradient method. The resulting method can be applied to a broad range of variational methods for inverse problems, e.g., for Tikhonov functionals and especially can handle smooth parts and non-smooth parts in the objective functionals appropriately.