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Non-convex optimisation in the imaging sciences

# A primal-dual method for non-linear inverse problems

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**Abstract:** Many inverse problems ranging from magnetic resonance imaging to cell microscopy involve non-linear forward operators. The primal-dual method of Chambolle and Pock being advantageous for convex problems where sparsity in the image domain is modelled by total variation type functionals, I recently extended it to non-linear operators. Besides motivating the algorithm by the above applications, through earlier collaborative efforts using alternative convex models, I will sketch the main ingredients for proving local convergence of the method. Then I will demonstrate very promising numerical performance.