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Non-convex optimisation in the imaging sciences

## A Continuous Interpretation of First-Order Splitting Methods

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**Abstract:** Popular first order optimization methods in image processing applications often use so-called splitting techniques: To minimize the sum of two functionals with easy to evaluate proximity operators, one introduces a new variable, minimizes for the two variables in an alternating fashion and uses some technique to iteratively enforce a relation (such as a linear equality constraint) between these variables. In this talk I will present some ideas of considering continuous limits of such minimization methods, which allow to interpret several popular algorithms as particular discretizations of two coupled differential inclusions. Particular attention will be paid to some simple examples that illustrate possible problems when applying such splitting techniques to nonconvex energies. I will discuss modifications of the underlying differential inclusions to possibly stabilize the resulting flow.