

A Subspace Version of the ARC Algorithm for Unconstrained Optimization

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This talk discusses subspace properties of the cubic subproblem that arises in the Adaptive Regularisation framework with Cubics (ARC) proposed by Cartis, Gould and Toint (Math. Program. 127: 245-295, 2011) for unconstrained smooth optimization. With an argument analog to that in Wang and Yuan (Numer. Math. 104: 241-269, 2006), it is shown that the trial step obtained by solving the cubic subproblem belongs to the subspace spanned by all gradient vectors computed until the current iteration, when the approximate Hessian is updated by quasi-Newton formulas. Based on this result, a subspace version of the ARC algorithm is presented for large-scale unconstrained optimization problems.