

An adaptive cubic regularization algorithm for nonconvex optimization  
with convex constraints and its function-evaluation complexity

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The adaptive cubic overestimation algorithm described in Cartis, Gould and Toint (2007) is adapted to the problem of minimizing a nonlinear, possibly nonconvex, smooth objective function over a convex domain. Convergence to first-order critical points is shown under standard assumptions, but without any Lipschitz continuity requirement on the objective's Hessian. A worst-case complexity analysis in terms of evaluations of the problem's function and derivatives is also presented for the Lipschitz continuous case and for a variant of the resulting algorithm. This analysis extends the best known bound for general unconstrained problems to nonlinear problems with convex constraints.