EVALUATION COMPLEXITY FOR NONLINEAR CONSTRAINED OPTIMIZATION USING UNSCALED KKT CONDITIONS AND HIGH-ORDER MODELS

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Resumo/Abstract:

The evaluation complexity of general nonlinear, possibly nonconvex, constrained optimization is analyzed. It is shown that, under suitable smoothness conditions, an ϵ-approximate first-order critical point of the problem can be computed in order $O(\epsilon^{1-2(p+1)/p})$ evaluations of the problem's function and their first p derivatives. It is also shown that strong guarantees (in terms of handling degeneracies) on the possible limit points of the sequence of iterates generated by this algorithm can be obtained at the cost of increased complexity. At variance with previous results, the approximate first-order criticality is defined by satisfying a version of the KKT conditions with an accuracy that does not depend on the size of the Lagrange multipliers. The presentation will be based on a recent paper with the same title co-authored by E. G. Birgin, J. L. Gardenghi, J. M. Martínez, S. A. Santos, and Ph. L. Toint.