Inexact Restoration Method for Optimal Control Problems

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Abstract:
A computational technique for unconstrained optimal control problems is presented. First an Euler discretization is carried out to obtain a finite dimensional approximation of the continous-time (infinite-dimensional) problem. Then the inexact restoration (IR) method is applied to the discretized problem to find an approximate solution. Convergence of the technique to a solution of the continuous-time problem is facilitated by the convergence of the IR method and the convergence of the discrete (approximate) solution as finer subdivisions are taken. The technique is numerically demonstrated by means of examples, and comprehensive comparisons are made with the Newton and projected Newton methods. Time permitting, an analogue of the IR method in function spaces is also described, which allows an optimize-then-discretize approach, rather than the discretize-then-optimize approach outlined above.