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A numerical method for solving shortest path problems. (English)

Summary: Chebyshev pseudo-spectral method is one of the most efficient methods for solving continuous-time optimization problems. In this paper, we utilize this method to solve the general form of shortest path problem. Here, the main problem is converted into a nonlinear programming problem and by solving of which, we obtain an approximate shortest path. The feasibility of the nonlinear programming problem and the convergence of the method are given. Finally, some numerical examples are considered to show the efficiency of the presented method over the other methods.

MSC:
49M37 Numerical methods based on nonlinear programming
49J15 Existence theories for optimal control problems involving ordinary differential equations
65N35 Spectral, collocation and related methods for boundary value problems involving PDEs

Keywords:
shortest path problem; Chebyshev pseudo-spectral method; nonlinear programming

Software:
Matlab

Full Text: DOI

References:
[15] Noori Skandari, MH; Kamyad, AV; Effati, S, Generalized Euler-Lagrange equation for nonsmooth calculus of variations,
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