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**Solving optimal control problems using the Picard’s iteration method**

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Abstract

In this paper, the Picard’s iteration method is proposed to obtain an approximate analytical solution for linear and nonlinear optimal control problems with quadratic objective functional. It consists in deriving the necessary optimality conditions using the minimum principle of Pontryagin, which result in a two-point-boundary-value-problem (TPBVP). By applying the Picard’s iteration method to the resulting TPBVP, the optimal control law and the optimal trajectory are obtained in the form of a truncated series. The efficiency of the proposed technique for handling optimal control problems is illustrated by four numerical examples, and comparison with other methods is made.

Mathematics Subject Classification: 49J15 / 93C15

Key words: Optimal control / Pontryagin’s minimum principle / Hamilton–Pontryagin equations / Picard’s iteration method / ordinary differential equations

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