

عنوان مقاله:

A novel methodology for optimal control problems with application to coordinate supplier development in a two-echelon supply chain

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خلاصه مقاله:

This paper deals with coordinating supplier development programs in a two-echelon supply chain which is formulated as a continuous time optimal control model. Drawing upon advanced ingredients of differential and Poisson geometry, a novel methodology is presented for the optimal control problem by reformulating and converting the Hamilton-Jacobi-Bellman partial differential equation (PDE) to a reduced Hamiltonian system, so that the exact optimal solution of the control problem can be obtained, instead of numerical estimation. The proposed methodology is applied to the problem of coordinating supplier development in a supplier-manufacturer supply chain to find the exact optimal solution. The analytical solution to the problem is obtained based on the proposed method and a numerical example is presented to further validate its applicability and superiority. The proposed methodology can be also applied to control problems in other optimization fields.

کلمات کلیدی:

Optimal control problem, Poisson bracket, Hamiltonian system, First integral, Supplier development, Supply chain coordination

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