On the Hamilton-Jacobi-Bellman Equation of Macroeconomic Dynamics

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Abstract

We consider an extension of the classical capital accumulation model, and show that the value function is the unique classical solution of the Hamilton-Jacobi-Bellman equation in some class of functions. Moreover, we propose a construction method of the solution of this model from the value function and the Hamilton-Jacobi-Bellman equation. The class of models we treat in this paper is sufficiently wide, and includes the Ramsey-Cass-Koopmans model with unbounded instantaneous utility function that admits some unbounded growth paths. By using our result, we solves some linear technology model in which the utility function is, for example, logarithmic.

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Keywords: Capital Accumulation Model, Hamilton-Jacobi-Bellman equation, Classical Solution, Linear Technology, Nonlinear Technology, Subdifferential Calculus.

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