

Hamiltonian Trajectories in Mathematical Economics

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Abstract

Growth models in macro-economics typically revolve around a few variables like "capital" and "consumption" and are cast as infinite horizon problems in discounted utility. Full convexity is usually present, but state constraints can intervene because the variables must stay nonnegative.

Economists have worked long and hard on analyzing the optimality conditions in such models, but not always with rigor. For instance, it's common to appeal to a "transversality condition at infinity" as being necessary and sufficient, in combination with an Euler-Lagrange equation or its Hamiltonian counterpart, but the necessity appears questionable without a self-defeating array of assumptions.

This talk will explain what is known in the subject and how it may go forward through extensions of Hamilton-Jacobi theory.