An Extension of von Neumann Growth Model: Capital Accumulation, Money and Consumption with Infinitely Many Kinds of Activities and Commodities

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Abstract

We extend the classical von Neumann growth model to cases where the index sets of commodities and/or activities are not finite but are compact metric spaces. The extension enables us to treat models with continuously many (or countably infinite) kinds of activities and commodities that are essentially equivalent to considering continuous production functions with degree of homogeneity 1, differentiated commodities including intermediate goods for capital accumulation, or incorporating consumption and fiat money under the consideration for infinitely many exchange-terms among money and goods, etc. Hence, we can obtain a unified framework on ordinary neo-classical growth arguments, capital-accumulation dynamics having general-equilibrium foundation, and arguments on consumption-loan type money with nominal and real interest rates, under the simple input-output viewpoint.

Keywords : von Neumann Model; Economic Growth; Capital Accumulation; Commodity Differentiation; Input Output Analysis; Matrix Game; von Neumann Revolution

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