An Extension of von Neumann Growth Model: Capital, Money and Consumption in Compact Metric Spaces of Activities and Commodity Indices

Ken Urai[*]
Satoru Kageyama[†]
Hiromi Murakami[‡]

August 23, 2013

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 in some cases, countably infinite) activities and commodities that are essentially equivalent to continuous production functions with degree of homogeneity one, differentiated commodities including intermediate goods for capital accumulation, consumption and fiat money under the consideration for infinitely many exchange-terms between money and other goods, etc. Hence, we can incorporate ordinary neo-classical growth arguments, capital-accumulation dynamics having general-equilibrium foundation, and arguments on money with nominal and/or real interest rates, into the unified framework from the simple input-output viewpoint.

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

JEL Classification: C62, C70, D53, E00, E40

[*]Graduate School of Economics, Osaka University, E-mail: urai@econ.osaka-u.ac.jp
[†]Graduate School of Economics, Osaka University, E-mail: qge803ks@student.econ.osaka-u.ac.jp
[‡]Graduate School of Economics, Osaka University, E-mail: pge027mh@student.econ.osaka-u.ac.jp