Stability, Multi-Stability and Complexity Analysis in a Dynamic Economic Model with Exponential Term

Hui Li[1], Wei Zhou[1], Tong Chu[2], and Xiao-xue Wang[1]

[1]Lanzhou Jiaotong University
[2]Zhejiang University of Finance and Economics

June 27, 2020

Abstract

In this paper, a discrete-time dynamic economic system, with exponential demand term and quadratic cost term, is established. We have spent great lot efforts in verifying the properties of existence and local stability of equilibrium points by Medium Theory and Zero-Point Theory. Immediately, the stability conditions are given in details. And then, by changing the valuesof parameters, the system shows some new and interesting phenomena in terms to stability and multi-stability, like different shape basin of coexisting attractors. Even some changes in the topological structure of basin have beenintuitively and more deeply analyzed by using numerical simulation. Finally, we utilize critical curves to analyze the reason of "hole" formation and to descript their evolution process. As a result, we can intuitively find that the generation of global bifurcation, like contact bifurcation or final bifurcation,is usually accompanied by the contact of critical curve and boundary.

Hosted file

`manuscript 111.docx` available at https://authorea.com/users/337358/articles/462956-stability-multi-stability-and-complexity-analysis-in-a-dynamic-economic-model-with-exponential-term