Analysis of Nonlinear Bertrand Duopoly Game with Heterogeneous Players

Authors : Jixiang Zhang

Abstract : A dynamic of Bertrand duopoly game is analyzed, where players use different production methods and choose their prices with bounded rationality. The equilibriums of the corresponding discrete dynamical systems are investigated. The stability conditions of Nash equilibrium under a local adjustment process are studied. The stability conditions of Nash equilibrium under a local adjustment process are studied. The stability of Nash equilibrium, as some parameters of the model are varied, gives rise to complex dynamics such as cycles of higher order and chaos. On this basis, we discover that an increase of adjustment speed of bounded rational player can make Bertrand market sink into the chaotic state. Finally, the complex dynamics, bifurcations and chaos are displayed by numerical simulation.

Keywords : Bertrand duopoly model, discrete dynamical system, heterogeneous expectations, nash equilibrium
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