

Global Bifurcations in a Duopoly Model with Adaptive Adjustment Process

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KeyWords: Duopoly. Dynamical Models. Neimark-Hopf bifurcation.

ABSTRACT

We consider a Cournot duopoly model, based on iso-elastic demand function and constant marginal costs for the competitors, in which the best replies r_i , $i = 1, 2$, of the competitors are derived by a constrained optimization problem. Moreover, we assume that the competitors do not immediately jump to the optimum in each step but they adaptively adjust their previous decisions in the direction of the optimum, so obtaining a dynamical model.

The possible dynamics of such a model and its global behaviour are investigated. In particular we shall show that the local stability analysis is not sufficient to understand the dynamic behaviours of the map. By means of our local-global approach we shall show that a characteristic of the model is the coexistence of two attractors: the "classical" Cournot equilibrium point (fixed point of the map) and a closed invariant curve (corresponding to periodic or quasi-periodic trajectories). The aim of this paper is to explain the global bifurcations leading to the appearance of such periodic trajectories, which are associated with a repelling invariant curve, bounding the basin of attraction of the Cournot equilibrium point.