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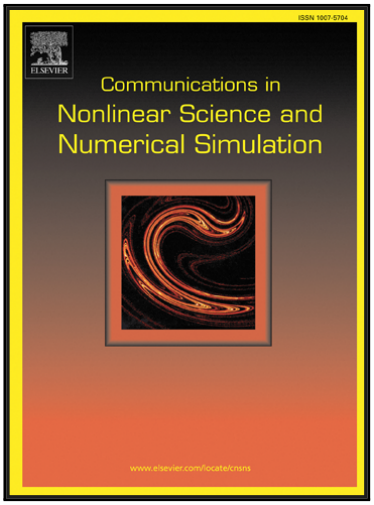

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The impact of Variable Cost on a Dynamic Cournot-Stackelberg Game with two decision-making stages

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Abstract: This paper analyses a dynamic model of Cournot-Stackelberg which involves a feedback regulation system based on the costs of production. The manufacturer makes decisions based on costs of production and wholesale prices as the leader of the market，while the retailers make decisions according to order amount. The decision-making process of the system is divided into two stages in order to carry out the research more clearly and the doubling period bifurcation will occur with speed of adjusting decision-making increase. It is proved that the stability of the model can be considered separately into two decision-making processes, the cross-effects of the two decision-making stages are analyzed. The manufacturer's decision-making has a decisive influence on the stability of the whole system when the manufacturer is a marketing leader and the parameters also have a significant effect on the stability of the system. Finally, the paper proposes a chaos control method based on adaptive method, which is inspired by decision-making methods. The result of the paper has great significance to the Cournot-Stackelberg game with variable costs and master-slave status.

Keyword: Complexity theory: Cournot-Stackelberg Game; Multi-stage; Disturbance; Variable Cost;

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