Dynamic Analysis for Ownership of Cars and Motorcycles in Taiwan

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Abstract

In this study, a dynamic analysis for ownership of cars and motorcycles is presented. A modeling procedure and the empirical study of Taiwan are proposed. The model is an ordinary differential system and is solved by the Broyden method. In addition, oil price is included in the model to enhance the predicted ability. According to the result, when oil price increases, the ownership of cars decreases, whereas the ownership of motorcycles increases. Our model is in the form of the Lotka-Volterra model and the predicted results have a good agreement with the historical data. In the system, cars play a role as preys and motorcycles play a role as predators. By our model, the competition of ownership of cars and motorcycles could be analyzed.

Keyword：vehicular ownership, oil price, dynamic competitive model