ABSTRACT

A NEW PRODUCTS DIFFUSION MODEL
WITH CONSIDERATION OF REPEAT PURCHASE

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This paper is concerned with the dynamic behavior of new products diffusing into the market. Generally speaking, the market progresses through the process such as the entrance of a new product, the entrance of the competitive products, and their replacement by the newer ones. Repeat purchase is an important consumer activity even for durable products in the recent market where new products continue to appear within a short period of time. Accordingly, we propose a new mathematical model using differential equations to explain the dynamics of the market in this paper.

Introduction of repeat purchase is the main characteristic of this model. The repeat purchase is defined as the phenomenon that previous customers of the product take part in the purchasing activities again after a certain period of time. The time until the previous customers take part in the purchasing activities again is considered as a random variable. The effect of brand loyal users on the repeat purchase is also examined. The number of potential customers is estimated being equal to the number of people who have sufficient income to purchase the product and its time variation is also considered.

A numerical analysis using some historical data of automobile registration shows that the model described in this paper represents the purchasing behavior very well. The time variation of the products diffusion intensity is also considered in the analysis. The analysis indicates that the automobile may keep its glory from being obsolete by the model change.