

# Optimal promotional policy for a new product in presence of firm's goodwill in Segmented Market: A control theoretic Approach

**Kuldeep Chaudhary, Prabhneet Kaur Sethi**

Department of Applied Mathematics, Amity Institute of Applied Sciences,  
Amity University, Noida, India  
[kchaudhary26@amity.edu](mailto:kchaudhary26@amity.edu)

## Abstract

The objective of a firm is to use market segmentation in promotion of a product to yield competitive advantages over its competitors. Market segmentation provides an opportunity to plan effective promotional policies in target market. In this paper, we use the concept of market segmentation in innovation-diffusion model for promotion of a new product under the influences goodwill of firm that also generates additional sales. We discuss evolution of sales under the assumption that practitioner uses mass and differentiated promotional effort for each segment and efforts vary from segment to segment. Here, we formulate an optimal control problem and obtain optimal promotional effort policy for proposed problem using maximum principle.

## Keywords

Market-Segmentation, Inventory-Production, Optimal Control Theory, Maximum-Principle

## Biography:

**Kuldeep Chaudhary** is currently the Assistant Professor in the Department of Applied Mathematics, Amity Institute of Applied Sciences, Amity University. He obtained his Ph. D. in Operational Research from University of Delhi and M.Sc. from Indian Institute of Technology(IIT), Roorkee respectively. He has published more than 20 research papers in the areas of software reliability, Marketing and Optimization. He has guided M.Sc. Dissertations in Applied mathematics. His research interests include mathematical modelling in optimal control theory and optimization in marketing, Inventory-production and software reliability.

**Prabhneet Kaur Sethi** obtained Bachelor of Science degree in Mathematics(H) from S.G.T.B. Khalsa College, Delhi University. She is currently pursuing Master of Sciences in Applied Mathematics from Amity University, Uttar Pradesh