

1096-H1-857

Ellina V Grigorieva* (egrigorieva@twu.edu), PO BOX 425262, Denton, TX 76204, and
Evgenii N Khailov. *Optimal production- sales strategies for a company at changing market price.*

A production-sales activity of a company is modeled by a nonlinear control differential equation of the dynamics of the production funds. The company produces a single consumer good, the demand on which always exists. The market price depends on the volume of the produced goods described by the Cobb- Douglas production function. The model has two bounded controls: 1. the share of the profit, $u(t)$, obtained from sales that the company reinvests into expanding own production, and 2. the amount of short-term loans, $K(t)$, taken from a bank for the same purpose. The problem of maximizing discounted total profit on a given time interval is stated. In order to find the optimal product-sales strategies for the company, the Pontryagin Maximum Principle (PMP) is used. It is proven that PMP is the necessary and sufficient condition for the optimality. In order to investigate the arising two-point boundary value problem for the maximum principle, an analysis of the corresponding Hamiltonian system is applied. Based on a qualitative analysis of the Hamiltonian system, our conclusions about the optimal solutions to the stated profit maximization problem are made. The results of numerical calculations for different model's parameters and their economic analysis are presented. (Received September 10, 2013)