

Differential game with a non differentiable point for a sport licensing contract

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Abstract

We consider a merchandise licensing agreement where a sport brand grants to a manufacturer the rights to use his own brand on the goods she produces. The “Royalty” clause requires that the licensee pays a monetary compensation for having such property and it generally consists of a fixed financial reward. Furthermore the licensor requires a percentage of the sales related to the sale of the branded products, in case the amount of sales exceeds a given amount.

We take into account such clause by considering a non differentiable term in the payoffs of the involved parts. A Stackelberg game constituted by two non-differentiable optimal control problems is formulated in order to find the Stackelberg equilibrium open loop advertising strategies for the licensor and the licensee. We discuss the existence conditions for such an equilibrium.

Keywords: Differential games; Advertising; Licensing, sports merchandise.