1035-O1-365   **Ellina Grigorieva*** (`egrigorieva@twu.edu`), PO BOX 425886, Professor Grigorieva E.V., Denton, TX 76204, and **Evgenii Khailov** (`khailov@cs.msu.su`), department of optimal control, Professor Khailov E.N., Moscow State Lomonosov University, Moscow, Russia. *Differential Hierarchical Game Between Manufacturer and Retailer.*

We consider interactions between manufacturer and retailer as two different "Leader- Follower Games": 1."Big" (well-known) manufacturer and "Small" (unknown) retailer.2."Big" retailer (i.e. Wal-Mart) and "Small" manufacturer (may be new on the market, small business). The Leader has an advantage to play first, the Follower has to response to the Leader's action. In Game 1, the Leader is Manufacturer. In Game 2: Retailer. Both players want to choose such a strategy (optimal production plan, optimal buying and reselling plan) that will maximize their profits. Therefore, the problems can be reduced to the maximizing of the corresponding functional of profit and solved using the Maximum Principle. The mentioned strategies of manufacturer and retailer form the Stackellberg equilibria in both Games. Though both models are described by the same system of differential equations and functionals, the solutions to the problems 1 and 2 will be significantly different. Game 2, when an advantage to start first is in the hands of the "Big" retailer, is more complicated, and it leads to singular type of optimal control. For Game 1, a differential game with the bounded control is solved. Both Games are investigated analytically and numerically, and optimal strategies are found. (Received September 04, 2007)