

Computer problems 05

Task 1. Three large mobile communication companies completely control the market of a certain country. Each company in each new period has the opportunity to choose one of the strategies: leader company, follower company, Cournot equilibrium, etc. Model the dynamics of this market, determine which strategies are relatively more profitable for the company. Cost functions and the total demand function are set parametrically by the user at the beginning of the program. Construct a win-lose matrix for each company when using different strategies depending on the responses of other companies.

Task 2. There is a dominant company and several follower companies that compete in the market. Each company has the opportunity to produce and sell its product at a certain price. The dominant company has much greater capabilities than follower companies, so it can set higher prices and produce a larger amount of the product. At the same time, the dominant company has a great influence on the price in the market and on the output of follower companies. The development of technology constantly changes the cost function of the dominant company. Follower firms, in turn, react to changes in the prices and volumes of the dominant firm's products and try to change their prices and volumes of production in order to remain competitive. The price and volume of production are also affected by changes in market demand. The purpose of the simulation model is to reproduce the interaction of the dominant firm and follower firms in the market, obtain market equilibrium in dynamics, and also study the impact of changes in prices and volumes of production on demand. It is necessary to create a simulation model that will take into account market dynamics and the reaction of firms to changes in prices and volumes of production.

Task 3. Company A is dominant in the market of new gadgets. It has the ability to produce gadgets with a cost that is 10 to 30% lower than the cost of competitors (depending on the volume: the larger the volume, the greater the advantage). There can be from 10 to 20 other firms operating in the market, which have the ability to freely enter/exit the market. Develop a simulation model that will show the dynamics of this market over 100 periods.

Solve the problem if a new firm appears in the 51st period with a 10 to 25% cost advantage over the original dominant firm. Compare the simulation results.