#### **Task 7. Economical models**

**Question 1**. An economic process is described. It is necessary to write down the appropriate mathematical model, select system parameters that correspond to exactly this behavior of the system, and give a biological interpretation to the observed results with an explanation of the reasons for this particular evolution of the system.

**Question 2**. A biological process is described. It is necessary to write down the appropriate mathematical model, select system parameters that correspond to exactly this behavior of the system, and give an economical interpretation to the observed results with an explanation of the reasons for this particular evolution of the system.

**Variants**

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| **№** | **1. Economic process** | **2. Biological process** |
| 1 | There are two economic entities. The capital of both companies is not very large, but not very small either. The capitals of both companies tend to certain values. | There are two biological species. The numbers of both species are initially neither very small nor very large. The number of the first species is decreasing, while the number of the second is growing. Over time, the numbers of both species grow without limit. |
| 2 | There are two economic entities. The capital of both companies is neither very small nor very large. The capital of the first company increases, and the second decreases. Over time, both companies go bankrupt. | There is one biological species. The number of the species is growing to a certain extent. |
| 3 | There are two economic entities. The capital of both companies is quite large. The capitals of both firms decrease to certain values. | There are two biological species. The numbers of both species are initially small. The number of the first species is growing, while the number of the second is decreasing. Over time, the numbers of both species increase. After some time it begins to decrease. Then the process is repeated. |
| 4 | There are two economic entities. The capital of both firms is initially small. It increases over time. Then the capital of the first company grows, and the second company goes bankrupt. | There are two biological species. The numbers of both species are initially small. Over time, it increases. Then the number of the first species grows, and the second species dies out. |
| 5 | There are two economic entities. The capital of both companies is initially large. Over time, it decreases. Then the capital of the second company grows, and the first company goes bankrupt. | There are two biological species. The number of both species is quite small initially. The numbers of both species increase to certain values. |
| 6 | There are two economic entities. The capital of both companies is quite small. The capitals of both firms increase to certain values. | There are two biological species. The numbers of both species are initially large. Over time, it decreases. Then the number of the first species grows, and the second species dies out. |
| 7 | There is one firm producing a product that is in limited demand. The capital of the company decreases by a certain amount. | There are two biological species. The numbers of both species are initially large. Over time, it decreases. Then the number of the second species grows, and the first species dies out. |
| 8 | There are two economic entities. The capital of both firms is initially small. The first firm is growing, and the second is decreasing. Over time, the capital of both firms grows. After some time it begins to decrease. Then the process is repeated. | There are two biological species. The number of both species is not very large and not very small initially. The number of both species tends to certain values. |
| 9 | There are two economic entities. The capital of both firms is initially small. It increases over time. Then the capital of the first company grows, and the second company goes bankrupt. | There are two biological species. The numbers of both species are initially neither very small nor very large. The number of the first species is decreasing, while the number of the second is increasing. Over time, the entire population dies out. |
| 10 | There are two economic entities. The capital of both companies is initially large. Over time, it decreases. Then the capital of the first company grows, and the second company goes bankrupt. | There are two biological species. The number of both species is very small initially. The numbers of both species tend to certain values. |
| 11 | There are two economic entities. The capital of both companies is neither very small nor very large. The capital of the first company decreases, and the second one grows. Over time, the capitals of both firms grow without limit. | There are two biological species. The numbers of both species are initially small. Over time, it increases. Then the number of the second species grows, and the species first dies out. |