

Seminar 6.

Task 1. Taras and Peter share 20 kg of apples and 30 kg of pears. The utility functions are $u(x; y) = xy$, $u(x; y) = xy$, where x - the weight of apples, y - the weight of pears. Construct a contract curve.

Task 2. Two households A and B consume two goods x_1 and x_2 with the following utility functions: $u_A = x_1^A x_2^A$ and $u_B = x_1^B x_2^B$. Initially, A has a set $(e_1^A, e_2^A) = (2, 6)$, B - $(e_1^B, e_2^B) = (10, 4)$.

- a) Draw the initial situation, and identify areas that are better and worse than Pareto. Determine the conditions for the Pareto optimum. Construct a contract curve for this economy. What distributions of goods are possible based on the initial situation?
- б) Calculate budget lines for households for other goods $p_1 = 4$ and $p_2 = 8$.
- в) Calculate the demand function of farms for both goods. At what price will there be equilibrium in both markets?

Task 3. A limited number of resources (capital - 50 units, labour - 100 units) is distributed between the production of products A and B. Production functions are $Q_A = K^{0,5} L^{0,5}$ and $Q_B = K^{0,2} L^{0,8}$. Construct an approximate curve of production contracts.

Task 4. The utility function of the first consumer is $U_1 = x_1 + y_1$, and the second $U_2 = 2x_2 + y_2$, where x_i is the number of apples, y_i is the number of pears. The first consumer has 5 apples and the second has 4 pears. Construct a contract curve.

Task 5. Roman and Serg share 15 apples and 25 pears. Roman's utility function $U(x, y) = XY$, Serg's utility function - $U(x, y) = XY^2$, where X is the number of apples, Y is the number of pears. Construct a contract curve.

Task 6. We have two consumers A and B with utility functions $U_A = x_A x_A$, $U_B = 6x_B + y_B$. Initial distribution of goods: $x_A = 20, x_B = 80, y_A = 180, y_B = 20$. Draw the optimal Pareto area.

Task 7. We have two consumers A and B who have utility functions: $U_A = x_{1,A}^\rho + x_{2,A}^\rho$; $U_B = x_{1,B}^\rho + x_{2,B}^\rho$. Initial distribution of goods: $x_{1,A} = 100, x_{1,B} = 0, x_{2,A} = 0, x_{2,B} = 100$. Calculate the Walras equilibrium and draw the optimal Pareto region, the contract curve.

Task 8. Two consumers (A and B) take part in the distribution of two goods. For consumers, the utility depends on the volume of consumption of goods: $u_A = x_1^{0,5} x_2^{0,5}$, $u_B = x_1^{0,25} x_2^{0,75}$. The total number of the first good is 20 units, the second 30 units. Initially, consumers are endowed with goods equally. Determine the equilibrium price ratio of goods.

Task 9. In the economy, two individuals (A and B) consume goods at prices $p_1 = 7, p_2 = 4$. The utility function of individual A $u_A(x_1, x_2) = x_1 x_2$, individual B - $u_B(x_1, x_2) = x_1 x_2$. Initially, individuals have the following sets: $E_A(5, 2)$ and $E_B(1, 11)$ respectively. Construct a contract curve.