Questions

Economic and Mathematical Models

Computational Sciences and Statistics

1. course, NIS, 2020 – 2021 academic year, spring semester

1. The subject of mathematical programming. Describe the formulation of a mathematical programming problem. About models. Examples of mathematical models.
2. Describe the basic problem of linear programming.
3. Dual problem to the basic problem.
4. Equivalent problems. Definition.
5. Conical form of a linear programming problem.
6. Describe the simplex method on Maple.
7. Elements of convex analysis. Euclidean space.
8. Convex sets. Projection. Convex functions.
9. The theory of linear programming. Basic concepts. Basic theorems.
10. Algebraic characteristics of the corner point.
11. Dual problems with mixed constraints.
12. The canonical form of a linear programming problem.
13. Finite methods for solving linear programming problems.
14. Simplex method.
15. Graphic solution. Convex shapes.
16. Solving linear programming problems by the simplex method on Maple 17.
17. The method of one-dimensional minimization.
18. Search for a segment containing a minimum point.
19. Fibonacci method and the golden section.
20. Parabolic method. Tangent method.
21. The method of cubic approximation.
22. Construction of linear economic models. Leontiev's model of a diversified Economy.
23. Productive model Leontiev. Total Cost Vector.
24. Transport Problems. Determination of the initial transportation plan.
25. The method of "northwest" corner.
26. The minimum element method. Vogel method. Getting the optimal plan of the transport problem using the method of potentials.
27. Theory of queuing. Calculation of the queuing system.
28. Correlation analysis. The concept of regression.
29. Solving examples of correlation analysis on Maple 17.
30. Regression analysis. Linear regression.
31. Nonlinear regression. Linear regression model.
32. Solution of examples of regression analysis on Maple 17.
33. Solution of examples of covariance analysis on Maple 17.
34. Dispersion analysis.
35. Variance analysis - classification by one feature.
36. Analysis of variance, classification by two signs.
37. Solving examples of Dispersion analysis of variance on Maple 17. (ANOVA)
38. Planning an experiment. The general idea of experiment planning.
39. Full and fractional factor experiments.
40. Conducting and processing the results of the experiment on Maple 17.

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