ThinkBS 305 (update course page)

Course title:

Applied Mathematics in Optimization Problems: Linear Programming, Transportation Problem, Assignment Problem.

Information about course:

Studying Applied Mathematics, a student will learn how to use a variety of mathematical and computational tools to solve problems in diverse fields, ranging from physics and engineering, to biology or medicine. He will develop the intellectual discipline and reasoning abilities needed to think through complex problems and develop practical solutions.
The main emphasis of an Applied Mathematics in Optimization Problems course is on developing the ability of the student to start with a problem, in non-mathematical form, transform it into mathematical language and then find the best solution of that problem.

Linear Programming

Linear Programming (LP, also called Linear Optimization) is used for obtaining the most optimal solution for a problem (such as maximum profit or lowest cost) with given constraints. In linear programming, we formulate our real-life problem into a mathematical model. It involves an objective function, linear inequalities with subject to constraints.
Linear Programming is a technique where we depict complex relationships through linear functions and then find the optimum points. The real relationships might be much more complex, but we can simplify them to linear relationships.
Therefore Linear Programming allows finding the best solution in a mathematical model whose requirements are represented by linear relationships.
Solving the studied applications as well as some sensitivity and parametric analyzes are performed with a module of the *WinQSB* software product, dedicated to Linear Programming.

Transportation Problem

Transportation Problem is one of the most important applications of quantitative analysis due to its spreading in real life. The classical Transportation Problem is a two-dimensional problem in which a single commodity (homogeneous product) is directly shipped from a set of source centers to a set of destination centers. The goal is to determine the amounts of the commodity to be transported over all routes so that the total transportation cost is minimized.
The theoretical study contains the mathematical model of the problem and the methodology for solving and analyzing it.
The numerical solving of the classic transportation problem as well as of some special cases of this problem is made with a module of the *WinQSB* software product that includes the transportation problem type.

Assignment Problem

The assignment problem is a special case of linear programming problem; it is one of the fundamental combinational optimization problems in the branch of optimization or operations research in mathematics.
The problem which deals with the allocation of the various resources to the various activities on one to one basis. It does it in such a way that the cost or time involved in the process is minimum and profit or sale is maximum.
Solving the studied applications is performed with a module of the *WinQSB* software product that includes the assignment problem type.

References

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Teacher

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