LCF5734 - Advanced Forest Management

Objective
To study quantitative methods that help the management and intensive management of forest populations.

The course offers the opportunity of a detailed analysis of research topics related to the construction and use of optimization mathematical models. It is emphasized analysis of management and forest planning problems.

Quantitative approach is the basis for modeling and analyzing problems in the forest area, as: sustainability, multiple use, spatial constraints and fragmentation, non-decreasing flows of production, and ecosystem management.

Content
This Advanced Forest Management course introduces students to the construction and use of mathematical optimization models geared towards production management of forest ecosystems.

The main scope is presented in the following sequence:

Basic formulas for forest planning;

Application of neoclassical planning techniques in electronic spreadsheets

Review of non constrained optimization mathematical techniques and derivatives of first and second orders;

Review of constrained optimization mathematical techniques and the Lagrange method;

Exercises involving the Lagrange technique, mathematical techniques and conditioned optimization through mathematical programming models;

Introduction to linear programming involving two-variable problems;

problem modeling and making decisions in natural resources management using linear programming techniques and applications (notation and principles).

Review of matrix algebra and matrices inversion;

comparing minimization techniques for fitting linear fuctions: sum of the squares of the deviations, minimizing the sum of the absolute deviations, and MINMAX of Tchebichev.

General linear programming model for forest management;

Solution of forest management problems and interpretation of results presented in specific software for linear programming;

Modeling techniques with linear programming aiming at management with sustainable, orderly and non-decreasing long-term productions;

Examples of use of decision support systems and heuristics in forest planning activities.

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