

## **201-1-5031 Non-linear and dynamic programming**

1. Convex analysis. Convex sets and convex functions.
2. Duality. Kuhn-Tucker theorem.
3. Methods for unconstrained optimization problems.
4. Methods for problems with constraints: penalty method, barrier method, feasible direction method, projection method.
5. Dynamic programming. The Bellman equation.
6. Applications of dynamic programming: inventory problem, equipment replacement problem.
7. Markov decision processes.

### **Literature.**

1. R. ROCKAFELLAR. CONVEX ANALYSIS. PRINCETON, 1970.
2. G. HADLY: NONLINEAR AND DYNAMIC PROGRAMMING. ADDISON-WESLEY, 1964.
3. Y. CENSOR, S. ZENIOS: PARALLEL OPTIMIZATION. OXFORD UNIVERSITY PRESS, 1997.
4. P. GILL, W. MURRAY, M. WRIGHT: PRACTICAL OPTIMIZATION. ACADEMIC PRESS, 1981.
5. AHARON BEN-TAL, ARKADI NEMIROVSKI.  
LECTURES ON MODERN CONVEX OPTIMIZATION :  
ANALYSIS, ALGORITHMS, AND ENGINEERING APPLICATIONS. 2001