Faculty: Mechanics and Mathematics **Level:** Magistracy

Department: Mathematical methods of control theory **Sector:**English

Specialty: Mathematics

Specialization: Mathematical theory of optimal processes

Cource: II

Subject : Main problems of optimal control theory

1. Statement of optimal control problem. Mathematical description of controlled object.
2. Statement of the optimal control problem. The class of admissible controllers
3. Statement of the optimal control problem. Quality criteria or functional
4. Mathematical description of controlled object. The initial state of object and purpose in controlling
5. Statement of optimal control problem. Bolsa, Mayer and Lagrange problem
6. Statement of the optimal control problem. The initial state of object and purpose in controlling.
7. Maximum principle
8. Differential maximum principle
9. Theorem about differential maximum principle
10. Stationary principle.
11. Integral maximum principle
12. Statement of optimal control problem. Lagrange problem
13. Statement of optimal control problem. Bolsa problem
14. The class of admissible controllers. Quality criteria or functional
15. Statement of optimal control problem. Mayer problem
16. Existence of optimal controller

17. Relation between maximum principle and classic variation calculus
18. Kalman theorem. Proof of neccesity.
19. Problem of optimal controlling for linear system with quadratic criteria
20. Controlling of linear systems
21. About controlling of equivalent linear system
22. Achivement set. Property 1
23. Relation between controlling and observation.
24. Notion of observation
25. Optimality principle, Bellman equation
26. Bellman equation
27. The multistages distribution problem
28. Bellman functional equation\
29. The class of admissible controllers. Quality criteria or functional
30. Notion of observation. Relation between controlling and observation
31. Approximately solution methods of optimal control problems.