

Faculty of Science and Mathematics / Mathematics / Diferencijalne jednačine

Prerequisites	None
Aims	In this course students get acquainted with simple differential equations, theorems about existence of solutions and methods of solutions. In second part of the course students get to know dynamic systems, phase paths, stability of solutions and position of equilibrium.
Lecturer / Teaching assistant	Nevena Mijajlović
Metdod	
Week 1, lectures	Differential equations (DE) in normal form.
Week 1, exercises	Differential equations in normal form.
Week 2, lectures	Differential equations in symmetric form.
Week 2, exercises	Differential equations in symmetric form.
Week 3, lectures	DE of higher degree. Lowering of degree of DE. Homogenous linear DE of n-order with variable coefficients.
Week 3, exercises	DE of higher degree. Lowering of degree of DE. Homogenous linear DE of n-order with variable coefficients.
Week 4, lectures	Non-homogenous linear DE of n-order with variable coefficients. Method of constant variation. Homogenous linear DE with constant coefficients.
Week 4, exercises	Non-homogenous linear DE of n-order with variable coefficients. Method of constant variation. Homogenous linear DE with constant coefficients.
Week 5, lectures	Non-homogenous linear DE of n-order with constant coefficients. Particular solutions. Lowering of degree of LDE of n-order when m linear independent solutions are known.
Week 5, exercises	Nonhomogenous linear DE of n-order with constant coefficients. Particular solutions. Lowering of degree of LDE of n-order when m linear independent solutions are known.
Week 6, lectures	Sturm's theorems. Systems of LDE. Method of elimination.
Week 6, exercises	Sturm's theorems. Systems of LDE (SLDE). Method of elimination.
Week 7, lectures	Homogenous and non-homogenous SLDE with variable coefficients. Method of constant variation.
Week 7, exercises	Homogenous and non-homogenous SLDE with variable coefficients. Method of constant variation.
Week 8, lectures	Homogenous SLDE with constant coefficients. Oiler's and matrix methods. Non-homogenous SLDE with constant coefficients. Particular solutions.
Week 8, exercises	Homogenous SLDE with constant coefficients. Oiler's and matrix methods. Non-homogenous SLDE with constant coefficients. Particular solutions.
Week 9, lectures	Test
Week 9, exercises	Test
Week 10, lectures	Lowering of number of equations. Solving of DE using series.
Week 10, exercises	Lowering of number of equations. Solving of DE using series.
Week 11, lectures	Boundary problem for LDE and SLDE.
Week 11, exercises	Boundary problem for LDE and SLDE.
Week 12, lectures	Proof of theorem about existence of solution of DE. Dependance of solutions of parameters and initial conditions.
Week 12, exercises	Dependance of solutions of parameters and initial conditions. Examples.
Week 13, lectures	Dynamical systems. Phase portrait. Stability of solution. Lyapunov and Chataev theorems.
Week 13, exercises	Dynamical systems. Phase portrait. Stability of solution. Lyapunov and Chataev theorems.
Week 14, lectures	Partial DE of first order.
Week 14, exercises	Partial DE of first order.
Week 15, lectures	Correctional test.
Week 15, exercises	Correctional test.
Student obligations	
Consultations	

Workload	
Literature	
Examination methods	
Special remarks	
Comment	
Learning outcomes	