

Differential and difference equations (EDDE)

Lecture: Dr. Mariusz Zając Tue 8-10 room 108

Ex. sessions: Dr . Mariusz Zając Tue 10-12 room 108
Dr . Krzysztof Leśniewski Tue 10-12 room 9A

Syllabus:

1. The notion of a differential equation, ordinary and partial differential equations, the order of a differential equation. Solving a differential equation – a particular solution vs. the general solution. The existence and uniqueness of solutions.
2. Separable differential equations and the method of separation of variables.
3. First order linear differential equations – homogeneous and nonhomogeneous. The method of variation of parameters.
4. Other differential equations reducible to the separable case.
5. Exact differential equations and integrating factors.
6. Differential equations whose order can be reduced to 1.
7. Linear differential equations of arbitrary order – the properties of solutions, the Wronski matrix and determinant.
8. Homogeneous linear differential equations with constant coefficients – the characteristic equation, fundamental systems of solutions.
9. Nonhomogeneous linear differential equations with constant coefficients – the variation of parameters and the method of undetermined coefficients.
10. Systems of linear differential equations – the elimination of variables, the variation of parameters and the matrix method.
11. The Laplace transformation – definitions and properties.
12. The Laplace transformation – the application to differential equations.
13. Difference operator and its properties. First order difference equations.
14. Linear difference equations of arbitrary order.
15. The discrete Laplace transformation and its application to difference equations.

More information available at:

<http://www.mini.pw.edu.pl/~zajac/edde>