Course title: Regular variation and differential equations

Course instructor(s): Jelena V. Manojlović

Course type (compulsory/elective): elective

Credit points: 12 ECTS

Prerequisites: none

Course objectives: Course focuses on theory of regular variation and its applications in the qualitative theory of differential equations.

Learning outcomes: Student should gain a thorough knowledge of the theory of regular and rapid varying functions and should be able to use this theory to establish the existence of regularly and rapid varying solutions of linear and nonlinear differential equations as well as to establish asymptotic properties of positive solutions.

Course description (outline):

- Properties of regularly and rapid varying functions
- The existence of regularly and rapid varying solutions of linear and nonlinear differential • equations
- Classification and asymptotic properties of solutions of nonlinear differential equations
- Asymptotic properties of regularly varying solutions of linear and nonlinear differential equations
- Existence and asymptotic properties of regularly and rapid varying solutions of nonlinear ٠ differential equations
- Existence and asymptotic properties of regularly varying solutions of systems of nonlinear differential equations

References:

- 5. V. Marić, *Regular Variation and Differential Equations*, Springer, 2000.
- 6. N. H. Bingham, C. M. Goldie and J. L. Teugels, Regular Variation, Encyclopedia of Mathematics and its Applications, 27. Cambridge University Press, 19

| Active teaching hours: 5 | Theoretical classes: 5 | Practice classes: | |
|--------------------------|-------------------------------|-------------------|--|
| Methods of teaching: | | | |

Lectures are conducted using conventional teaching methods in interaction with the students. Knowledge of students is tested through homeworks and preparation and defense of seminar papers. Oral exam checks the understanding of the whole course material.

| Grading structure | | | | |
|----------------------|--------|--------------|--------|--|
| Pre-exam obligations | Points | Exam | Points | |
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| Colloquia | 40 | Orrel errore | 40 | |
| Seminars | 40 | Orai exam | 40 | |