

Introduction to Delay Differential Equations

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Timetable: 16 hrs. Lectures start on May 8, 2013 (dates already fixed, see the calendar), Torre Archimede, Room 2BC/30.

Course requirements: Numerical methods for ordinary differential equations.

Examination and grading: written examination.

SSD: MAT/08 Numerical Analysis.

Aim: to introduce students to delay differential equations and their numerical solution.

Course contents:

1. Functional Differential Equations (FDEs). Retarded Functional Differential Equations (RFDEs). Particular types of RFDEs: Delay Differential Equations (DDEs), Integro-Differential Equations (IDEs), State-Dependent DDEs (SDDDEs), State-Dependent IDEs (SDIDEs). Neutral Functional Differential Equations (NFDEs). Mathematical models based on such equations.
2. Existence and uniqueness of the solution and continuous dependence on the data for an initial problem of RFDEs.
3. Continuous Runge-Kutta (CRK) methods for RFDEs. Discrete order, uniform order and global order of a CRK method for RFDEs. Order conditions.