UCL Université catholique de Louvain

LINMA1170

2013-2014

Numerical analysis

5.0 credits	30.0 h + 22.5 h	1q

Teacher(s) :	Van Dooren Paul (coordinator) ; Absil Pierre-Antoine ;
Language :	Français
Place of the course	Louvain-la-Neuve
Main themes :	Numerical solution on non-linear equations: location of real and complex zeros of a polynomial, iterative methods and convergence theorems. Numerical solution of linear systems : iterative methods (conjugate gradients, Jacobi, Gauss-Seidel, Krylov methods), preconditioning. Numerical solution of ordinary differential equations : multistep methods, stability analysis, stiff differential equations.
Aims :	To better understand numerical methods for solving equations and to analyze their numerical properties such as convergence and stability. Equations solvers include finding zeros, solving systems of equations and solving ordinary differential equations. *The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled "Programmes/courses offering this Teaching Unit".*
Content :	1. Location of the roots of a polynomial 2. Approximation via fixed point iteration 3. Bernoulli method and the QD algorithm 4. Iterative methods for large scale systems 5. Ordinary differential equations
Other infos :	Prerequisites: First cycle level in numerical calculus and programming. Support: many references are used and mentioned during the course.
Cycle and year of study :	> Master [120] in Mathematics > Master [120] in Computer Science and Engineering > Master [120] in Computer Science > Bachelor in Mathematics > Bachelor in Engineering > Master [120] in Statistics: General
Faculty or entity in charge:	MAP