LINMA2710

2012-2013

Numerical algorithms

5.0 credits	30.0 h + 22.5 h	2q

Teacher(s) :	Van Dooren Paul ;
Language :	Anglais
Place of the course	Louvain-la-Neuve
Main themes :	- Quantitative study of floating point rounding errors - Specification of the notions of "numerical stability" and "conditioning" - Development of iterative methods and convergence criteria that are computer-independent - Examples of complexity analysis of algorithms - Development of high performance parallel algorithms
Aims :	To strengthen the know-how in "scientific computing'' via a critical analysis of algorithms and via the development of state-of-the-art algorithms in numerical analysis, that have a good performance on modern computing platforms. *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 :	- Qualitative analysis of rounding errors - Definition of numerical stability and conditioning - Convergence of iterative algorithms - Critical analysis of classical algorithms illustrating basic concepts - LU factorization of matrices - Iterative refinement - Bloc methods and parallel algorithms - Algorithms for polynomials - Fast matrix multiplication - Fast Fourier Transform
Other infos :	Prerequisites: Basic knowledge (1st cycle) in numerical analysis and programming (MATLAB) Evaluation: Theoretical exercises and MATLAB exercises count together for 15% of the final score. The written exam amounts for 85% of the final score. Supporting material: Typeset course notes complemented by the book: Nick Higham, "Accuracy and Stability of Numerical Algorithms", SIAM Publications, Philadelphia, 1995
Cycle and year of study :	> Master [120] in Computer Science > Master [120] in Computer Science and Engineering > Master [120] in Mathematical Engineering
Faculty or entity in charge:	MAP