Faculty of Applied Sciences

INMA2171　Analyse numérique : approximation, interpolation, intégration

[30h+15h exercises] 5 credits

This course is taught in the 2nd semester

Teacher(s):　　　　　Alphonse Magnus
Language:　　　　　　　French
Level:　　　　　　　　　Second cycle

Aims

In-depth analysis of diverse methods and algorithms representative in the matter of numerical resolution by computers of significant classes of scientific or technical problems, in relation with the themes underlying the applied mathematics

Main themes

- Approximation of functions by polynomials: Chebyshev (best approximation, polynomial series), L2 norm (best average approximation, orthogonal polynomial series, Fourier series).
- Interpolation of functions divided by polynomials: Lagrange and Newton formulas, divided differences, iterative methods of Neville, formulas of finished differences.
- Numerical integration: Gaussian methods, formulas of finished differences.
- Error estimation and applications: Peano theorem, Euler-Maclaurin formula, extrapolation to the limit (Romberg scheme, etc.) Modalities of organisation: exercises: in class, in relation with the material seen. This activity will receive a grade that will come into play in the final points. Exam: oral on the material seen in class (closed book), partially with written preparation.

Content and teaching methods

See at the following address :
http://www.math.ucl.ac.be/~magnus/num1a/m2171to.txt

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

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Other credits in programs

MAP22	Deuxième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(5 credits)	Mandatory
MATH13BA	Troisième année de bachelier en sciences mathématiques	(5 credits)	Mandatory