UE Differential Calculus, Wavelets and Applications

Niveau d'étude
Bac +5

ECTS
6 crédits

Crédits ECTS Echange
6.0

Composante
UFR Informatique, mathématiques et mathématiques appliquées (IM2AG)

Période de l'année
Automne (sept. à dec./janv.)

Diplômes intégrant cet élément

- Master Mathématiques et applications

Langue(s) d'enseignement: Anglais

Ouvert aux étudiants en échange: Oui

Crédits ECTS Echange: 6.0

Code d'export Apogée: GBX9AM50

Présentation

Description

The course is structured in two parts, treated respectively and independently by Sylvain Meignen and Kevin Polisano. The first part is devoted to differential calculus and its applications in image restoration and edge detection. The second part is dedicated to the construction and practical use of the wavelet transform. Wavelets are basis functions widely used in a large variety of fields: signal and image processing, data compression, smoothing/denoising data, numerical schemes for partial differential equations, scientific visualization, etc. Connections between the two parts will be made on the aspects of denoising, edge detection and graph analysis.

Course outline

Part I: Differential Calculus

1. Differentiability on normed vector spaces

Informations non contractuelles.
Dernière mise à jour le 30 juin 2026

2. Image restoration
3. Edge detection
Part II: Wavelets and Applications

1. From Fourier to the 1D Continuous Wavelet Transform
2. Wavelet zoom, a local characterization of functions
3. The 2D Continuous Wavelet Transform
4. The 1D and 2D Discrete Wavelet Transform
5. Linear and nonlinear approximations in wavelet bases
6. The graph Fourier and wavelets transforms

Heures d'enseignement

CM	CM	36h

Période : Semestre 9

Infos pratiques

Contacts

Responsable d'UE

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Campus

Grenoble - Domaine universitaire

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