PARCOURS PHYSIQUE OCÉAN ET CLIMAT
semestre 8 Physique POC

Analyse de données 2

Présentation

This course introduces "classic" elementary linear methods widely used for the analysis of insitu, satellite, numerical modelling data. Classes are hands-on sessions with computers during which students are taught to implement numerical algorithms in order to tackle specific problems of "fitting", interpolation, principal component analysis. Some of these methods will be applied to real insitu physical data collected on board research vessel *Albert Lucas* during a day trip at sea in the bay of Brest.

Objectifs

In addition to mastering the numerical implementation of the algorithm, students should understand the domain of application and the limitations of the fore-seen methods in order to re-use and adapt them for specific problems.

Pré-requis nécessaires

elementary knowledge in linear algebra, scientific programming, python, statistics.

Compétences visées

> Identify a data analysis method to tackle a specific problem
> Build and adapt efficiently numerical algorithms designed for data analysis purposes
> Validate the results obtained (error estimation)
> Estimate the spatial and time interactions within a system using deterministic correlations

4 crédits ECTS

Volume horaire

Cours Magistral : 7h
Travaux Pratiques : 4h
Travaux Dirigés : 21h
Terrain : 6h

Descriptif

During this course, Students will be taught some key elementary linear methods used for the analysis of data either collected from insitu and satellite satellite observations, of produced by the integration of numerical models.Classes will be mostly composed of hand on sessions using *Jupyter-Notebook,* during which students implement numerical algorithms. The course is organized in 5 chapters:

1. linear regression and least square fitting
2. piecewise linear and cubic interpolation
3. optimal interpolation
4. 2D fourrier spectrum
5. empirical orthogonal functions

Students will handle a written report of the analysis of the physical insitu data collected at sea.

Modalités de contrôle des connaissances

Session 1 ou session unique - Contrôle de connaissances

Nature de l'enseignement	Modalité	Nature	Durée (min.)	Coefficient	Remarques
	CT	Ecrit - devoir surveillé	120	50%	
	CC	Autre nature		25%	
	CC	Ecrit - rapport		25%	

Session 2 : Contrôle de connaissances

Nature de l'enseignement	Modalité	Nature	Durée (min.)	Coefficient	Remarques
	CT	Oral	30	100%	