

Master Physique fondamentale et applications

Projets numériques - numerical projects

Informations

Composante : Faculté des Sciences

Langue(s) d'enseignement

Anglais

Contenu

This course unit aims to train students to acquire practical knowledge in solving physical problems numerically using a scientific programming language such as Fortran 90. Sessions take place in a computer lab and involve the numerical resolution of problems from various fields of physics. The course introduces different numerical techniques for solving differential equations (Euler-Cromer and Verlet methods) applied to the calculation of planetary trajectories, as well as Monte Carlo methods for integral computation.

Compétences à acquérir

Mastery of development tools: text editors used for writing Fortran code, as well as associated compilation and debugging tools.

Knowledge of Fortran syntax: variable declaration, management of different data types and arrays, control structures such as loops and conditionals, and subroutine calls

Formulate a physical problem into equations and discretize these equations by selecting an appropriate grid

Write a report on a numerical project, including a concise presentation of the approach used, the numerical methods employed, and an analysis of the numerical results.

Modalités d'organisation

20 h TP and projects in a computer lab

Bibliographie, lectures recommandées

"Modern Fortran", M. Curcic

"Programmer En Fortran - Fortran 90 et ses évolutions, Fortran 95, 2003 et 2008" - C. Delannoy

Prérequis recommandés

Fundamentals of algorithms
UNIX commands

VOLUME HORAIRE

- Volume total: 20 heures
- Travaux pratiques: 20 heures

Codes Apogée

- SPFBU18C [ELP]

Pour plus d'informations

[Aller sur le site de l'offre de formation...](#)

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