

NUMERICAL ANALYSIS

DESCRIPTION. The course will be divided in two parts

- **Finite difference methods for PDEs (Fagioli).** In this first part we will give a quick overview on the main numerical methods for Partial Differential Equations and provide as reference example the finite difference method.
- **Fourier Transform (Cicone/Dell'Acqua).** In this second part we will introduce the Fourier Transform, its discrete version and present the so called Fast Fourier Transform.

DURATION: 6 hours divided in 3 lectures.

PROGRAM:

- **Lecture 1**, Wednesday February 14, 10:30 - 12:30. Numerical methods for PDEs. Transport equation.
- **Lecture 2 part 1**, Tuesday, February 20, 10:30 - 11:30. Finite differences for Heat, Waves and Laplace equations.
- **Lecture 2 part 2**, Tuesday, February 20, 11:30 - 12:30. Fourier Transform.
- **Lecture 3**, Thursday, February 22, 9:30 - 11:30. Discrete and Fast Fourier Transform.

BIBLIOGRAPHY:

J. C. Strikwerda, *Finite difference schemes and partial differential equations*, 1989

E. O. Brigham, *The Fast Fourier Transform*, Prentice-Hall, 1974