

Matrix computation and geometry



ECTS
4 crédits



Hourly volume
51h

Introducing

Linear algebra, resolution of linear systems, use of matlab or python.

Objectives

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At the end of this module, the student will have understood and be able to explain (main concepts):

- QR factorization: the Gram-Schmidt and Householder methods
- Singular value decomposition
- Application to the least squares problem.
- Piecewise functions, C_k continuity, natural cubic splines and their local and global representations, basis of B-Splines, B-Spline curves and their control points.
- The extension to NURBS curves and to surface modelling in CAD.

The student will be able to:

- Determine the most efficient method to solve a least squares problem by identifying the characteristics of the problem.
- Determine and compute the interpolating spline, the smoothing spline, and the least squares spline of n given points.
- Build a B-Spline curve of n given points (analytically and by a subdivision algorithm (de Casteljau, de Boor))
- Apprehend, modify a NURBS curve.

Practical info

Location(s)

Toulouse

Necessary prerequisites

Necessary knowledge: