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Politecnico di Torino

Academic Year 2009/10 (first time established in A.Y.1999/00)

01LQMDR, 01LQMAX, 01LQMJA

Linear algebra

1st degree and Bachelor-level of the Bologna process in Mechanical Engineering - Vercelli (I FACOLTA' DI INGEGNERIA)

1st degree and Bachelor-level of the Bologna process in Civil Engineering - Vercelli (I FACOLTA' DI INGEGNERIA)

1st degree and Bachelor-level of the Bologna process in Electronic And Computer Engineering - Vercelli (III FACOLTA' DI INGEGNERIA)

Teacher	Status	SSD	Les	Ex	Lab	Years Stability
Spreafico Maria Luisa	RC	MAT/03	30	20	0	0

SSD	CFU	Activities	Area context
MAT/02	5	A - Di base	Matematica, informatica e statistica

Objectives of the course

The goal of this course is to learn the fundamental tools of linear algebra which are basic for engineering applications.

Expected skills

At the end of the course the student will be able to use matrix calculus, to solve linear systems, to compute dimension, bases, intersections and unions of vector and subvector spaces, to compute eigenvalues, eigenvectors with applications to diagonalization of square matrices and to the study of conics in the plane.

Prerequisites

The students are expected to know results and techniques from trigonometry, complex numbers and basic mathematic of high school.

Syllabus

- Matrices (sum, products, rank, determinant, invertible matrix).
- Linear systems (Gauss algorithm, Rouché-Capelli's Theorem, Cramer's Theorem).
- Vector spaces (geometrical meaning, basis, dimension, subspaces: intersection sum and direct sum).
- Linear applications (Kernel, images, composition).
- Eigenvalues and eigenvectors, similarity to diagonal matrices.
- Euclidean spaces (norm for vectors, orthonormal basis). Spectral Theorem and quadratic forms.
- Geometry in coordinates of the plane (line and conics).

Laboratories and/or exercises

Exercise sections are done during the course. A text of exercises with complete solutions can be find in my personal web page.

Bibliography

The english notes of the corse can be find in my personal web page.

Revisions / Exam

The examination consists in a written proof based on resolution of exercises and in an oral discussion about the main theorems proved during the course.

No calculator, no texts or notes can be used during the examination.

Programma definitivo per l'A.A.2009/10

