



MATHEMATICS.
DIPLOMATURA DE CIENCIAS EMPRESARIALES.
2007/2008

- 1. Matrices and determinants.**
Definitions. Matrix operations. Determinants and their properties. Inverse matrices. Rank.
- 2. Vector spaces.**
Definitions. The vector space R^n . Linear dependence and independence. Subspaces. Bases. Scalar products. Norm of vectors.
- 3. Linear transformations.**
Definitions. Elementary properties. Matrix formulation. Kernel and image of a linear transformation.
- 4. Eigenvalues and diagonalization.**
Eigenvalues and eigenvectors of a matrix. Characteristic polynomial. Diagonalization.
- 5. Quadratic forms.**
Definition. Matrix formulation. Diagonal formulations. Sign. Quadratic forms subject to constraints.
- 6. Functions of several variables. Continuity.**
Functions of one variable. Function of several variables. Vector functions. The concept of limit. Limits in R^2 . Continuity.
- 7. Functions of several variables. Differentiation.**
Derivatives of functions of one variable. Directional derivatives and Partial derivatives. Gradient. Differential of a function. Differentiation of vector functions. Jacobian matrix. Chain Rule. Higher order derivatives. Hessian matrix.
- 8. Implicit Differentiation.**
Implicit function theorem. Derivatives of implicit functions.
- 9. Homogeneous Functions.**
Definition. Properties. Euler theorem.
- 10. Polynomial Approximations of functions.**
Taylor polynomial for functions of one variable. Taylor's formula. Taylor approximation for functions of several variables.
- 11. Multivariable optimization.**
Unconstrained optimization with several variables. Optimality conditions. Optimization with equality constraints. Lagrange multiplier method. Second order conditions.
- 12. Integration.**
Indefinite integrals. Definite integrals. Improper integrals. Multiple integrals.
- 13. Financial Topics.**
Simple interest and discount. Compound interest and discount. Annuities. Present and future value of an annuity.

Bibliography.

Chiang A.C.: "Fundamental methods of mathematical economics". McGrawHill. 1984.
Sydsaeter K., Hammond P.: "Essential mathematics for economic analysis". Prentice Hall. 2002.

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