

MATHEMATICAL THEORY FOR SOCIAL SCIENTISTS

Lecturer: D.S.G. Pollock

PART I: Functions, Derivatives and Series

1. Limits and Continuity
2. Derivatives
3. Mean-Value Theorems
4. The Taylor-Series Expansion
5. The Binomial Theorem
6. Exponential Series
7. Growth Processes and Logistic Functions
8. Maxima and Minima of Functions

PART II: Matrices and Linear Algebra

9. Matrices and Equations
10. Matrix Multiplication
11. Determinants
12. Matrix Inversion
13. Solving Equations by Gaussian Elimination
14. Vector Spaces
15. Geometry and Linear Algebra

PART III: Difference and Differential Equations

16. Polynomial Equations
17. Complex Numbers
18. Linear Difference Equations
19. Iterative Solutions and Analytic Solutions
20. The Second-order Equation with Complex Roots
21. Differential Equations
22. Difference and Differential Equations Compared

PART IV: Calculus of Several Variables

23. Functions of Several Variables
24. Partial Derivatives
25. Quadratic Forms
26. Gradient Vectors and Hessian Matrices
27. Unconstrained Optimisation
28. Optimisation Subject to Constraints

Books

There are numerous books of mathematics for economists, some of which will serve our purposes adequately. Three of these are

- [1] Chiang, A.C., *Fundamental Methods of Mathematical Economics*, McGraw-Hill Kogakusha.
- [2] Simon, C.P. and L. Blume, *Mathematics for Economists*, W.W. Norton and Co.
- [3] Holden, K. and A.W. Pearson, *Introductory Mathematics for Economics and Business*, Macmillan.