MA844 COMPUTATIONAL THEORY OF ITERATIVE METHODS 4 0 0 4

Unit 1

Solving Smooth Equations: Linearization of Equations, The Newton-Kantorovich Method, Local Convergence, Convergence under Twice-Frechet Differentiability Only at a Point,

Newton-like methods: Two-point methods, Relaxing the convergence conditions, A fast method

Unit 2

More Results on Newton's Method: Convergence radii for the Newton-Kantorovich method, Convergence under weak continuous derivative, Convergence and universal constants, A Deformed Method, The Inverse Function Theorem.

Unit 3

Equations with Non smooth Operators: Convergence of Newton-Kantorovich Method. Case 1: Lipschitzian Assumptions, Convergence of Newton-Kantorovich Method. Case 2: Holderian Assumptions, Convergence of Newton-Kantorovich Method. Case 3: Local Lipschitzian Assumptions, Convergence of the Secant Method Using Majorizing Sequences.

Unit 4

Applications of the weaker version of the Newton-Kantorovich theorem: Comparison with Moore Theorem, Miranda Theorem, Computation of Orbits, Continuation Methods, Trust Regions,

TEXTBOOKS/ REFERENCES:

1. Ioannis Argyros, *Computational Theory of Iterative Methods*, Elsevier Publisher.
2. S.R.K.Iyengar and R.K.Jain, *Numerical Methods and Scientific Computing*, New Age International Publishers.
3. L.B. Rall, *Computational Solution of Nonlinear Operator Equations*, E. Robert Krieger, New York, 1969.