MA845   INTRODUCTION TO INTERVAL ANALYSIS   4-0-0-4

Unit I
The Interval Number System
Basic Terms and Concepts, Order Relations for Intervals, Operations of Interval Arithmetic, Interval Vectors and Matrices, Some Historical References;

First Applications of Interval Arithmetic
Examples, Outwardly Rounded Interval Arithmetic, INTLAB, Other Systems and Considerations;

Further Properties of Interval Arithmetic
Algebraic Properties, Symmetric Intervals, Inclusion Isotonicity of Interval Arithmetic.

Unit II
Introduction to Interval Functions
Set Images and United Extension, Elementary Functions of Interval Arguments, Interval-Valued Extensions of Real Functions, Fundamental Theorem and Its Applications, Remarks on Numerical Computation;

Interval Sequences

Unit III
Interval Matrices
Definitions, Interval Matrices and Dependency, INTLAB Support for Matrix Operations, Systems of Linear Equations, Linear Systems with Inexact Data, More on Gaussian Elimination, Sparse Linear Systems within INTLAB;

Interval Newton Methods

Unit IV
Integration of Interval Functions

Integral and Differential Equations
Integral Equations, ODEs and Initial Value Problems, ODEs and Boundary Value Problems, Partial Differential Equations.

TEXT BOOKS/ REFERENCES: