MATH 317

"Fuzzy Set"

1. Basic Definitions and Examples

   - Universal Sets, Crisp (or non-Fuzzy) Sets, Vauness and Imprecisiem, Fuzzy Sets, Illustrative Examples

2. Fundamental Logical and Algebraic Operations

   - Inclusion and Equality of Fuzzy sets, Intersection and union of Fuzzy Sets, Complement and Empty Fuzzy Sets, Normal and Subnormal and Normalized Fuzzy Sets, Support of Fuzzy Sets and Convex Fuzzy Sets, Hieght, Cross Over Point

   - Basic Operations Between Fuzzy Sets (addition, subtraction and multiplication) of Fuzzy Sets, m^{th} Power of Fuzzy Sets

3. The Construction of the Membership Function Numerical (or Tabular) Method, Functional Method, (S-Function, π-Function, T-Function, Trapezoidal Function), Inspection Method

4. α-Level Set

   - Definition of α-Level and Strong α-Level Sets, Properties of α-Level Sets, Fuzzy Singeltons, Fuzzy Number, Basic Algebraic Operations (+, -, *, /) Between Fuzzy Numbers using α-Level sets

5. Fuzzy Differential Equations

   - Types of Fuzzy Ordinary Differential Equations, Linear Fuzzy System of ODE's with Initial Condition, Parametric Equations of System of Fuzzy ODE's, Fuzzy BVP's, Lower and Upper Ordinary Systems of ODE's Relative to ODE's

6. Fuzzy Differentiation and Integration

   - Types of Fuzzy Differentiations, Method of Evaluation using the Extension Principle, Types of Fuzzy Integration, Fuzzy Function, Properties of Fuzzy Differentiation and Integration, Illustrative Examples

7. Introduction additional Topics in Fuzzy Sets Theory

   - Fuzzy Group Theory (Binary Operation, Definition, Identity and Inverse Element in Fuzzy Group)

- Fuzzy Linear System of Algebraic Equations and its Solution

- Fuzzy Real Analysis (Distance Between Two Fuzzy Sets, Fuzzy Metric Spaces, Closed, Open and Bounded Fuzzy Sets, Fuzzy Sequence and Cauchy Sequences)

Books:

1. Fuzzy Mathematical Techniques with Applications, by Kamdel A.

2. Fuzzy Set Theory, Foundations and Applications, by Klir G. J.

3. Fuzzy Set Theory and its Applications, by Zimmermang H. J.