

Semester-II, Paper-4
NEURAL & FUZZY LOGIC CONTROL

Teaching Scheme

Lecturers: 4 Hrs / week

Practical: 2 Hrs / week

Examination Scheme

Theory: 100 marks

Term work: 25 marks

Unit 1.

(10 Hrs, 20 Marks)

Artificial neural systems, Preliminaries, fundamental concepts & models of artificial system, neural network learning rules, Hebbian, perceptron, delta Widrow-Hoff learning rules. Single layer perception classification: Classification model, features & decision regions training & classification using discrete perception, algorithm & examples, single layer continuous perceptron networks for linear separable classification.

Unit 2.

(10 Hrs, 20 Marks)

Multilayer feedback work networks, Generalized delta learning rule, feedforward recall & back propagation training learning factors. Single layer feedback networks: basic concepts of dynamical systems mathematical of discrete time & gradient type Hopfield networks, transient response of continuous time solution optimization problems.

Unit 3.

(10 Hrs, 20 Marks))

Neural network in control system, Neuro-control approaches, training algorithm evaluated training algorithms, through simulation, self tuning neuro-control scheme, self tuning PID controller, Application of neuro-control for process control

Unit 4.

(10 Hrs, 20 Marks)

Introduction of fuzzy control, Introduction fuzzy control form an intuition perspective, mathematical of fuzzy control fuzzy sets, fuzzy relations, approximate resolving representing a set of rules, Non linear fuzzy control: The control problem, FKBC as non linear transfer element PID & duding mode type FKBC some typical application of fuzzy based control systems.

Unit 5.

(10 Hrs, 20 Marks)

Fuzzy knowledge based controller FKBC design parameters Structure of FKBC fuzzification and Defuzzification module, rule based choice of variable and contents of rules, derivation of data based choice of membership function and scaling factors, choice of fuzzification and Defuzzification procedure. Fuzzy-Neuro and Neuro-Fuzzy Controllers.

References:

1. Introduction of artificial neural systems, "J.M.ZURADA", Jaico publication House 1997
2. Neural networks: comprehensive foundation, "S.HAYKIN", McMillian College Publishing company inc. 1994
3. Neuro control and its application, "S.OMATU, M.KIALID, R.YUSOF", Spring Verlag London Ltd. 1996.
4. An introduction to fuzzy control, "D.DRIANKOV, H. HELLENDORN and M REINFRANK", Narosa Publication House, 2nd reprint 1997.
5. Neural Network Design, "Hagan, Demuth Deak", Thomson Learning.
6. Neuro-fuzzy and soft computing, PHI publication
7. Fuzzy logic: Intelligence control and Information, "John Yen", Pearson publication.

List of Experiments:

Term work shall consist of at least **eight** experiments based on above topics using MATLAB software.