ABSTRACT

Survey of research work has inspired the author to explore applications of soft computing techniques as better alternatives for implementation of adaptive and robust observers, Estimators, Controllers and compensator for linear, Nonlinear or time varying process control systems using current soft computation techniques such as Fuzzy logic, Artificial Neural Network, Adaptive Neural Fuzzy Inference systems (ANFIS).

The research work aims at developing a classical algorithm for designing robust observer-estimator with/ without noisy output for time invariant as well as time varying systems. Since in many cases it may not be possible to have an exact model for noise, an alternative model in terms of neuro-fuzzy estimator may be designed and implemented on digital computer.

Attempts are made to design observer for a time varying/Bilinear system using Dynamic programming and Method of Generalized Inversion. Development and Implementation of Single layer and Two layer Fuzzy compensator for the estimation and removal of nonlinearity for a process control system using PID controller. MATLAB/SIMULINK/Fuzzy/Neural Network are used for testing and Implementation a robust adaptive observer.

Development of a robust hybrid output-feedback controller that combines the fuzzy controller with a robust PFI observer and comparision of errors with classical or traditional method.