ABSTRACT

Motors & Drives are used in Electro mechanical plant in modern Industries such as Automotive, Aerospace, Industrial Automation Equipment and Instrumentation. Direct current motors & A.C. Induction Motors are very commonly used as variable speed drives in different applications. Variable speed motors & drives requires robust controller in the presence of load variation, parameter variation and un-modeled dynamics. This encourages use of advanced control methods for the design & development of controller. The objective of this thesis is to design and implementation of control algorithms using soft computing techniques based on sliding mode control approach for motors and drives.

Variable structure control (VSC) or Sliding mode control (SMC) is the popular robust control techniques for control of motors & drives. This approach is preferred for controller design of drives and motors in presence of parameter variations and load torque disturbances. The variable structure system with sliding modes is the recent research domain in control of servo drives with dc motors, induction motors and synchronous motors for the speed control and position control applications. Here attempt has been made to survey the different sliding mode approaches with different sliding surfaces and the control laws used in controller design of motors and drives.

This research aims at the design of soft controller algorithm with sliding mode control approach for motors and drives. Discrete-time Sliding Mode Control algorithm is designed using Multi rate Output Feedback approach for the position control of D.C.Motor. Multisegment sliding Mode controller for Induction motor drive using Indirect Field Oriented control designed of trapezoidal profile for speed and position control. Fuzzy logic technique and GA technique is also incorporated in the design.

Finally the controller algorithms implemented using PWM & SPWM approach for three phase Voltage source inverter fed Induction motor drive on TMS320F28335 DSP from Texas Instruments using Real time workshop tool, embedded coder tools of SIMULINK MATLAB and Code Composer studio version 3.3