ABSTRACT

Permanent magnet Synchronous motors, from past few decades are playing a vital role in different areas and are proving to be very advantageous. These PMSM drives are also used in different control applications. Generally DC drives are used in control applications in earlier days but due to the simplicity, AC drives are used now a-days.

The control system is designed around the concept of two-loop control. The outer speed control loop generates a torque reference using a PI controller. A given torque may be realized by different combinations of the armature and the field currents. This flexibility is exploited to make additional specifications in the form of the torque angle and the internal angle of the motor. With these specifications, unique values of current references are generated. In case of permanent magnets the field current is not controllable, either the torque angle or the internal angle can be independently specified.

The inner loop is the current controller and it is designed as to be faster than the speed loop and the method of Exact Feedback Linearization Technique is done by this current loop and also the operation of the state feedback controller for achieving the steady state error and for the cancellation of the nonlinear terms are done using this loop. The system exactly linearized by a nonlinear state feedback. The unmeasurable damper winding currents are estimated by a nonlinear reduced order observer.

In this project, we aim at the speed control of the voltage source inverter fed PMSM drive by using an advanced controller namely H-8 Controller to make the system robust and also to get the effective performance characteristics achieving the zero steady state value even when there are changes in the system parameters.

Keywords: H-8 controller, state feedback control, exact feedback linearization, Permanent magnet motor.