

CHAPTER - VI

SUMMARY AND CONCLUSION

During the last decade personal computers are widely used in instrumentation and control applications because of lowering down the prices. Now a days computer based data acquisition systems are very popular in many fields for measurement and control. Transducers are used to convert physical parameters into electrical signals. These converted signal must be converted in to digital form. This can be achieved by using A to D converter before interfacing to the computer.

Computer is a fast device and it can measure, process and control signals one by one within short time. To handle the multiple signals, multiplexers are used. A/D converter, multiplexer etc. forms a data acquisition. In computer based data acquisition system these components operate under the control of computer. In the present investigation the dedicated computer based data acquisition system is designed and developed for on line computer monitoring of DC motor. The present work is divided in to five chapters.

Chapter-I gives the survey of the literature regarding the control of DC motor. It also describes the statement of the problem and introduction of the dissertation.

Chapter II introduces the electrical machines. Theoretical back ground of DC motor is given in detail. The construction and working of different types of DC motor are discussed along with their characteristics. Mathematical presentation of motor is expressed

different theoretical expressions. More stress is given on the DC series motor, which is used in the present work.

Chapter III deals with design and development of computer based data acquisition system for measuring various parameters like speed, current, voltage, etc. of DC series motor operated under different load conditions. The hardware of the system is divided into two parts, interfacing card and signal conditioning card. The interfacing card consists of IBM PC/XT/AT compatible ADC with 8 single ended input channels and two DAC with two single output channels.

Signal conditioning card consists of circuits, for speed, voltage and current sensing of DC motor. The sensed current drawn by motor is taken across the one ohm resistance connected in series with the armature of the motor. The speed measurement system was designed with slotted opto-coupler. The voltage measurement system is developed with variable potentiometer.

Chapter IV describes the development of the system software which organize the overall system and measures the various parameters of the DC motor and determines the performance of the machine. The system software is menu driven which consists of input module, computational module and display module. Input module does the job of data collection of the motor under control. Computational module performs the task of computation of performance parameters of DC motor by using data previously stored in the individual file. The display module performs the task of displaying the data in numerical or graphical form.

Fifth chapter deals with the performance simulation of the DC motor and practical parameter measurement of DC motor with the developed data acquisition system. The simulation performance is compared with the practical performance and it is found that these results are in good agreement with the theoretical results.

In the previous chapters developed computer based data acquisition system is tested for displaying the performance parameters and following conclusion can be drawn from the test results.

- 1) A wide range of DC motor characteristics and there by displaying of different parameters of motors may be possible with slight modification in software and hardware.
- 2) The developed computer based data acquisition system is very useful in measurement and displaying parameters.
- 3) The accuracy of the present system is well within the acceptable range
- 4) The accuracy of the present system can be improved slightly by using higher bit ADC.
- 5) Looking into the percentage of error for various parameters. This method is quite feasible and adaptable as the percentage of error is well within the tolerable limits.
- 6) The present system measures the different parameters at different load conditions under continuous operation.
- 7) As the continuous information about motor parameters under operating conditions is readily obtained. This type of system can be used as a supervisor control system for the electrical machine.

In the present work only one motor is under control and we have used first three channels of ADC to sense the different parameters. With the additional channels the system can be expanded for two machines as we have 8 channels of ADC. The only one channel is sufficient for one motor if we use the multiplexer for each channel and the system can be used for supervision of eight motors. With the slight modification in hardware and software the present system may be used for overload protection of motors under control.