

ABSTRACT

The aim of this thesis is to construct a speed control system which has minimum losses and smooth speed operation. The system depends on the reduction of harmonics to achieve these results.

A microcomputer-based converter inverter system is implemented. The microcomputer is used to control the operation of the system and to protect the system component from being damaged in case of a short circuit.

The converter section is a bridge rectifier with a dc chopper. The control of the output voltage is achieved by controlling the operation of the dc chopper. The two-position control method, which is a closed loop control method, is used for this purpose.

A three phase transistorized inverter is used. The operation of this section is controlled by a simple sinusoidal pulse width modulated signal.

The operation of each section is analyzed theoretically by a simulation program. The harmonic losses are calculated for different cases and the harmonic spectrum is shown for each cases.

The experimental system is used to drive an induction motor. A resolution of less than (0.2 Hz) can be achieved. The results shown a close agreement between the expected and the real operation.