

## **ABSTRACT**

Control system plays an important role today. Almost every place was found a tool that uses the control system, one of which is on ac motor. Ac motor is one kind of electric motor which speed is fairly difficult to be regulated or controlled. It is therefore in need of optimal control system which has a performance index. One form of optimal control systems with the performance index is a Linear Quadratic Regulator.

In this thesis, in doing the design of the control system 1 phase induction motor with a microcontroller-based Linear Quadratic Regulator. The design of the system is divided into two parts, namely the hardware and software. The hardware includes a microcontroller Arduino Uno, the first induction phase ac motors, ac induction motor driver first phase, rotary encoder. As for the software design using a programming language and MATLAB Arduino

Results to be achieved from the design of this system is the stability and accuracy of 1 phase induction motor speed with the feedback changing. Parameter stability and accuracy in measuring systems lies in the characteristics of the system in the form of rise time, settling time, error state, and over shoot.

**Keywords: Induction Motors, Linear Quadratic Regulator, Microcontroller**