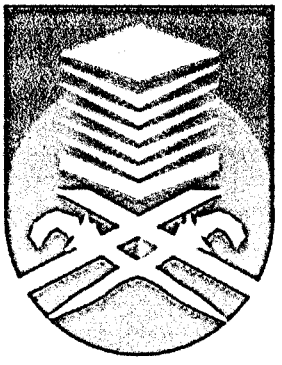
MODELING OF SIMPLE PUMP SYSTEM USING MATLAB/SIMULINK

This project thesis is presented in partial fulfillment for the award of the

Bachelor of Electrical Engineering (Honours)

UNIVERSITI TEKNOLOGI MARA



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ABSTRACT

The thesis presents a simulated study of simple pump system performance characteristics using MATLAB/SIMULINK software. The developed SIMULINK model enables both the dynamic and steady-state operating condition characteristics of the pump system, such torque, current and speed to be determined and analyzed. The understandings of the performance characteristics are crucial in the process of designing and selection of proper specification of motor and protection devices. This is because it enables accurate prediction of highest possible magnitude of peak performance characteristics to be made. Analysis performed on the obtained simulated results at different load level of operations enables optimization operation of the pump system to be determined and subsequently will lead to the operation of the system with much better energy-saving capability.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

A pump system discussed in this thesis is of the type that utilized the electro-mechanical energy conversion method. It comprises of a three phase induction motor that drives a pump which is being coupled through coupling of both shafts. The block diagram illustrating the discussed system is shown in Figure 1.1. The adjustable speed drives of the pump system are being provided by variable voltage and frequency supply generated by the pulse-width modulation (PWM) controlled inverter. The adjustable speed drive pump system enables the flow rate of the fluid to be controlled with ease unlike in conventional single speed driven pump system.

It is very difficult to control the flow rate of the fluid in a conventional pump system because the required torque at various values of flow rate are proportional to square of the speed of rotation of the pump shaft. With the ability of operating a pump system with adjustable speed drives, its optimum efficiency of operation can be further increased and subsequently lead substantial amount of energy saving could also be achieved.

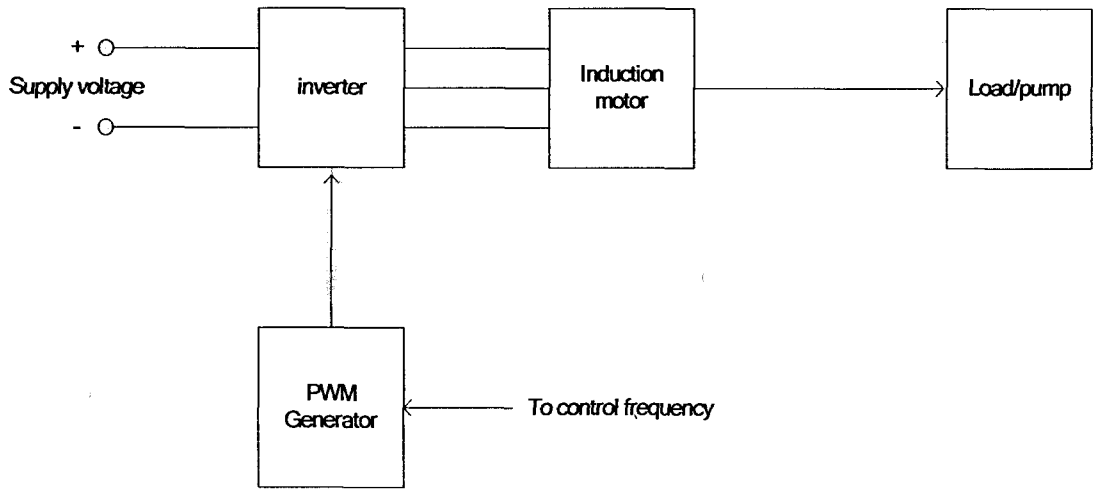

Figure 1.1: Block diagram for simulation model.