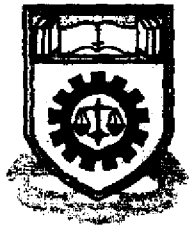
INDIRECT SELF TUNING CONTROLLER BASED ON POLE PLACEMENT METHOD

This thesis is presented in partial fulfillment for the award of the
Bachelor in Electrical Engineering (Honours)
INSTITUT TEKNOLOGI MARA



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APRIL 1999

ACKNOWLEDGMENT

First and foremost, '' Syukur Alhamdulillah " to Allah, the Most Gracious and Most Merciful for ensuring myself to be healthy to carry out my study and to complete this thesis. Secondly , I wish to give my deepest gratitude and appreciation to Prof. Ir. Dr Syed Abdul Kader Al Junid, for his moral support, guidance, encouragement, and patience all the way from the beginning till the end of this project. Without his co-operation and substantiation for this thesis, it would have been impossible.

And last but not least, I wish to give my highest appreciation, gratitude and love to my parents ; Shafie Hj Abdul Rahman and , my sisters and my brothers for the financial support and motivation and for the encouragement, patience and prayers, which enable the project to be completed as required.

May God bless them all.

Wassalam.

ABSTRACT

In this thesis the design of an adaptive controller, i.e. self tuning controller based on pole placement method is discussed. The servomotor is assumed to be slowly time varying and its parameters are identified recursively using the recursive least squares estimation technique. The estimated parameters are then used to update the controller setting to obtain the optimum performance. The controller is designed using Ragazzini's Direct Synthesis Method, which is pole-zero cancellation. The controller system is simulated using MATLAB and is shown to perform according to specifications.

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 Introduction.

Control systems are playing an important role in our personal lives. Its purpose is to control the output of the process so that the quality and accuracy of the systems are improved. In general, control systems can be categorized as being open loop and closed loop. If the output variable is not measured and fed back to the controller, then the total system consisting of the controller and plant is an open loop system. The charateristic of open loop system is slow response and high sensitivity to environmental conditions. The closed loop or feedback control systems are defined as systems in which the output variable is fed back to controller of the system. It is less sensitive to noise, disturbances and changes in the environment. On the other hand, closed loop systems are more complex and expensive than open loop systems.

In control systems, analysis of the system is an important an essential feature of the design process. The results of this analysis are compared to the performance specifications that are desired for the proposed systems. The main points in system analysis and design are to produce the desired transient response, the accuracy or steady state response and achieving stability.

Traditionally, the analysis of a system having a single input and single output use the classical method. As systems become more complex, the state space or state variable approach are used, and is important in the applications for multivariable systems.

The ever increasing technological demands of today call for very complex systems, which in turn require highly sophisticated controllers to ensure that the