UNIVERSITI TEKNOLOGI MARA

COMPARATIVE ANALYSIS OF TW0-MASS SYSTEMS USING PROPORTIONAL INTEGRAL AND FUZZY LOGIC CONTROLLER

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ABSTRACT

Industrial drive system is mainly used in manufacturing, industrial automation and material handling. The increasing demand for a better quality and better performance of two mass drive systems causes industry to produce high dynamics properties and to reduce the vibration effectively. The proposed work in this paper proposed Proportional-integral controller and Fuzzy Logic controller as the alternate method to reduce the vibration. Methods that had been suggested in reduce the vibration by using a controller. This research presents Proportional Integral controller using an analytical equation to get the damping coefficient of the drive system was explored in this project. While fuzzy logic in application control in embedded control and information processing is using an analytical method. Moreover, the performance between the responses of proportional-integral controller and fuzzy logic has been examined using MATLAB. Due to simulation result, fuzzy logic has a high accuracy due to suppression of vibration in the tracking system. Its shows that fuzzy logic controller is the best performance better than proportional integral controller.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Industrial drive system is mainly used in manufacturing, industrial automation and material handling. The increasing demand for a better quality and better performance of two mass drive system causes the industry to produce high dynamics properties and to minimize the transient response. A two-mass system made up of a motor connected to a load through a stiff shaft to prevent oscillation. The presence of oscillation can cause damage when the shaft is not taken into consideration when designing the motor. Design of stiff shaft contribute to torsional vibration which can make the drive system unstable. The vibration leads to low product quality and unstable system which can ruin the mechanical coupling between the drive and load.

In order to reduce the vibration of two mass drive system, different control structures are developed. The research in [1] analysed that the application of the feedback from one selected variable is necessary to damp the torsional vibration effectively. The simplest ways to solve the vibration problem which happens under the reference speed changes is by changing of the reference velocity slowly. However, it decreases the drive system dynamics performance, which results in disturbance in the form of torque changes.