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VIBRATION CONTROL FOR FINE MOTION FLEXIBLE ROBOT ARM USING PROPORTIONAL INTEGRAL DERIVATIVE (PID) CONTROLLER

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ABSTRACT

In this paper, the three term controller also known as Proportional Integral Derivative (PID) controller was proposed to control the most common problem on flexible robot arm which is vibration control problem. The controller description and properties included to support the relation with the vibration problem of flexible robot arm. MATLAB is used for system identification to validate estimation by comparing model response and measured response from the independent data. Estimation method is used to estimate the parameters of the selected model structure thus evaluate the estimated model so that it meet the requirement for the robot arm. In this project, transfer function method have been use to calculate model response so that it almost equal with the measured response properties. For tuning of PID controller, the trial and error method have been used where the value of Integral term (Ki), Derivative term (Kd) and Proportional term (Kp) was adjusted so that it adequate to reduce the model response. For model design with controller and simulation of the system, Simulink is used for the purposes.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

In this millennium era, most of the production industry are using robot arm as a production mechanism to produce their product. The robot arm system is a computer - controlled arm type, usually programmable and multifunction, with functions nearly identical to a human arm. The robot arm on its own can combine several mechanisms or components or even more complex robot control systems. The rotational and linear movement of robot arm can be done by the manipulator which are connected to the joints. Robot system is basically consists of vision system, robot arm and controller. In other words, this robot system is influenced by many factors like robustness design, acceleration of motion, vibration suppression, torque that affect the performance.