THESIS TITLE: A STUDY ON THE DYNAMIC CHARACTERISTICS AND CONTROL OF PNEUMATIC CYLINDERS AT HIGH SPEED DRIVING

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ABSTRACT

A mathematical model is developed for investigating the dynamic characteristics and control of pneumatic cylinders at high speed driving. Analytical results obtained from the proposed model obviously indicate that the dynamic behavior of the pneumatic cylinders depend upon the inlet pressure, the orifice area and the load mass. For the velocity responses of the pneumatic cylinders using control action, it is obvious that the responses using the proportional-integral-derivative control action are more accurate and faster than those of the proportional control action and the proportional-integral control action. In addition, experiments have also been conducted in order to verify the validity of the proposed model. It has been found that the theoretical responses are in good agreement with the experimental data.