DYNAMIC SIMULATION, MODELING & ANALYSIS OF AN AUTOMATED SEALING & PRE-CUT PLASTIC BAG MACHINE

5 BTL - 00 - 2

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24 FEBRUARY 2003

PROJECT VERIFICATION

I hereby declare that the project paper or thesis has been read and
I have the opinion that the project paper is appropriate in terms of scope coverage and quality for awarding the Bachelor Technology in Mechatronics Engineering

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Date : 5 FEB. 2003

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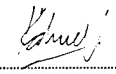
MECHATRONICS ENGINEERING
INDUSTRIAL ELECTRONICS DEPARTMENT
GERMAN-MALAYSIAN INSTITUTE AND KUITTHO

24 FEBRUARY 2003

OATH

I hereby declare that this thesis, submitted to GMI as a partial fulfillment of the requirement for the degree of Bachelor Technology in Mechatronics Engineering. I also certify that the work explain here is entirely my own except for literature review, the fundamental mathematical modeling and summarise when sources are appropriately cited the references. This thesis also is free from any plagiarism and available within the GMI library or available within the Kuittho library for the purpose of research and development.

Signature : 

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Date : 5th March 2003

DEDICATION

I would like to dedicate this thesis to my beloved family especially my mom and dad with their confidence in me to overcome the entire obstacle in my journey to success. This dedication also goes to my lovely fiancée whom persistently gives me precious support and motivation through out the year.

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ABSTRACT

A mathematical model is an algorithm or set of equations that is combined with a set of data values to represent the significant behavior of a system, process, or phenomenon. The development of a mathematical model for a given real-world system can be a difficult task. In cases where the system's dynamics are not well understood, a series of experiments must be performed to collect data that can then be processed using various techniques to yield a model of system behavior. This thesis introduced some of the methods used in the development of mathematical models of real world systems and phenomena.

Based on the study, the system response of tension plastic for an automated sealing and pre-cut plastic bag machine will give us the overview of the system performance. The mathematical model of DC motor are developed and tested with PI controller model too see the feedback with various values of Kp (proportional gain) and Ki (Integral gain). The study of characteristics of control system like settling time, rising time, steady state error and overshoot has been done. Previous study of this kind of web tension or unwinder/winder application is mostly used of PI controller. The reason will be discuss on this thesis implementation. Using Matlab and Simulink as a simulation software does the experiment.

The system simulator is made for guideline or reference to engineer or machine design so that they can test their material used in unwinding and winding system applications. Using Labview as virtual instrument software does the testing experiment.

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LIST OF SYMBOLS AND ABBREVATIONS

Va	-	Armature voltage or source voltage
Vc	-	induced voltage
VRa	-	Voltage across armature resistance
VLa	-	Voltage across inductance
Ra	-	Armature resistance
ia	-	Armature current
La	-	Inductance or armature coil
Kv	-	Velocity constant
ωa	-	The rotational velocity of the armature
$T\omega$	-	The torque produce by velocity of rotor
$T\omega'$	-	The torque due to rotational acceleration of the rotor
Te	-	Electromagnetic torque
TL	-	The torque of the mechanical load

J	-	The inertia of the rotor
B, b	-	Damping coefficient
Ωm	-	Speed of motor
θ	-	Position of shaft
f	-	Tension.
τa	–	armature circuit time constant
τl	–	tension/speed time constant
τc	–	current PI time constant
τs	–	speed PI time constant
τt	–	tension PI time constant