Master's Theses in Automatic Control 1978-1979

Wittenmark, Björn

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MASTER THESIS IN AUTOMATIC CONTROL 78/79

BJÖRN WITTENMARK

INSTITUTIONEN FÖR REGLERTEKNIK
LUNDS TEKNISKA HÖGSKOLA
1980

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Författare
08T0
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MASTER THESIS IN AUTOMATIC CONTROL 78/79

Referat (sammandrag)
26T0
The report contains abstracts of master theses (examensarbete) made at the Department of Automatic Control, Lund, during the academic year 78/79. During this year 9 theses were made by 12 students. The theses are written in Swedish with an English abstract.

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author

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1. INTRODUCTION

The education for civilingejörsexamen (Master Degree in Engineering) is completed with an independent work, the master thesis (examensarbete). It should show the student's ability to attack and solve a larger problem. The time devoted to the thesis is about three months of full time work. The thesis can be done individually or by two students together.

This report is a collection of the document pages of the theses completed during the academic year 1977/1978. During this time 9 theses were finished by 12 students. The major part of the theses is made within the framework of the research program at the department. Some of the theses are made as feasibility studies or made in cooperation with the industry or other departments.

Further information concerning the results can be obtained from the Department of Automatic Control by contacting the advisor. The theses are available at the University Library in Lund (Address: University Library 2, Box 1010, S-221 03 LUND, Sweden).

2. LIST OF THESES

TFRT-5213 Blom, A and Tengvall, F: Digital Reglering av Bränn-portal, (Digital Control of a Cutting Machine), July 1978.

TFRT-5214 Norén, P: Mikrodatorbaserat Positioneringssystem för ASEA IRb-system, (Microcomputer based positioning System ASEA IRb-system), October 1978.

TFRT-5215 Olesen, H and Jensen, C: Identifiering av Strängspruta, (Identification of Extruder Dynamics), October 1978.

TFRT-5216 Wiberg, S: Analys av Extruder, (Analysis of an Extruder), October 1978.

TFRT-5217 Hultqvist, G: Datastyrd Svetsautomat - Hårdvara, (Computer controlled Welding Machine - Hardware), November 1978.

TFRT-5218 Upadhyaya, L: Glykos Insulin Reglering, (Glycose and Insulin Regulation), December 1978.

TFRT-5219 Löfgren, L: Minidatorreglerad Smältmaterialhantering, (Minicomputer Control of the Mixing of Materials of a Melting Plant), December 1978.

TFRT-5220 Johansson, G and Jonasson, K: Simulering av Ämnestemperaturer i en Stegbalksugn, (Simulation of Slab Temperatures in a Walking Beam Furnace), March 1979.

TFRT-5221 Ahlström, A: Mätningar och Experiment på Laboratorieprocesser, (Measurements and Experiments on Laboratory Processes), May 1979.

3. SUBJECT LIST

Subject	Thesis
Analysis and synthesis	
Extruder	5215, 5216
Walking beam furnace	5220
Biological systems	5218
Digital control	5213, 5214, 5217, 5219
Identification	5215
Laboratory processes	5221

4. DOCUMENT PAGES

The following pages contain the document pages of the theses.
All theses are written in Swedish with an abstract in English.

On the document page the following data are given:

Report number	(Dokumentnamn, Dokumentbeteckning)
Adviser	(Handläggare)
Author	(Författare)
Tigle in English and Swedish	(Dokumenttitel och undertitel)
Abstract	(Referat)
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Gustaf Olsson
Författare
Anders Blom
Freddy Tengvall

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18T0
Digital reglering av brännportal (Digital control of a cutting machine)

Referat (sammandrag)
Current regulator to the cutting machine at Kockums Computer Systems AB is impaired by a to big control error.The purpose has been to reduce this error a factor of 10.An interface to the cutting machine has also been developed.This is intended for use in a future system based on a LSI-11 computer and a REMA-bus.

The results of the control tests prove that the position error can be reduced by feed forward to the desired value.The modified regulator can without problems replace the original version.A test of the interface shows that the communication between interface and computer satisfies the requirements.An arrangement for test of interface and synchro has been constructed.

Referat skrivet av
Authors

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Peter Noren

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Dokumenttitel och undertitel
18T0 Mikrodatorbaserat positioneringssystem för ASEA IRb-system
(Mikrodatorbased positioningsystem for ASEA IRb-system)

Referat (sammandrag)
26T0 In this report one way of doing mikrodatorbased positioning of a robot axis is described.
Todays position-regulator has been transfered to software.
A Resolver to Digitalconversion has been made and an interface to the Drive-unit constructed.

Referat skrivet av
42T0 Author

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Dokumenttitel och undertitel
Identifiering av strängspruta (Identification of extruder dynamics)

Referat (sammandrag)
This report describes a series of experiments performed on an extruder. The aim has been to find a mathematical model for the extruder. A linear model with screw speed as input and lip pressure as output has been derived.

Two different identification approaches have been used. In one, basic physical relationships are derived and the parameters have been adjusted by simple step response experiments. In the other approach linear parameter models have been identified by Maximum Likelihood or Least Squares techniques. The result show that relatively good identifications can be made with simple methods.

The causes of quality variations are discussed and show the essentials of a constant feeding of raw material.

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Author

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08T0 Staffan Wiberg

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Dokumenttitel och undertitel
18T0 Analys av extruder (Analysis of an extruder.)

Referat (sammandrag)
26T0 The purpose of this report is to investigate the temperature variations of extruded plastics, meant for coating package products. The resin is melted and pushed forward in the gap between a screw and a hot cylinder, whose temperature can be changed by varying the set-points of temperature controllers. When knowing the set-point variations and the resulting changes in the output temperature of the plastics, the gain, eigenfrequencies and time depedence of this system can be obtained by computerised identification. A second order model will result.

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18T0
Datastyrd svetsautomat

Hårdvara

Referat (sammandrag)
26T0
This report contains the hardware of a control unit to a curvi-linear controlled automatic welding machine and the software to a demonstration system. The core of the control unit is a microcomputer system with an Intel 8080 as the central-processor unit.

The hardware contains a incrementgiver for the position-counter and one shaft-card for each degree of freedom. The shaft-card contains a position-counter, incrementlogi and a D/A-converter for the velocity control of the engine.

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18T0
Glukos insulin reglering
(Glucose and Insulin Regulation)

Referat (sammandrag)
26T0
Four mathematical models of Glucose and Insulin Regulation were tested and their parameter values were optimised to experimental data.
Two types of experiments were performed:

- Standard Glucose Infusion Test
- Insulin Injection

A special interactive program was used for simulation and optimization of the models. Three models showed a rather good fitting while one did not allow good fitting.

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Author

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Dokumenttitel och undertitel
Minidatorkontrollerad smältmaterialhantering
(Minicomputer Control of the Mixing of Materials of a Meltingplant)

Referat (sammandrag)
At a meltingplant you often want that the materials which go into the melting-furnace are as well mixed with each other as possible. In this report a minicomputer based real-time system that controls and regulates the mixing is described, as well as the method Boliden AB is using when mixing the materials. The system gets information from the operator which materials that will be used, the total weight of each material and the accuracy with which the materials should be mixed. The operator can at anytime during a mixing change the composition of the materials. The dialog between the system and the operator is made through A) A Teletype and B) Special push-buttons situated at the places where the uloading of the materials takes place. Through a fast printer the system regularly passes information about 1) How far the mixing that is in progress has reached. 2) How much you have used of each material during the day and during the month. The system is in use since 1977.

Referat skrivet av
author

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Författare
Gunnar Johansson
Kaj Jonasson

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Dokumenttitel och undertitel
18T0
Simulering av ämnestemperaturer i en stegbalksugn

(Simulation of slab temperatures in a walking beam furnace)

Referat (sammandrag)
20T0
At Oxelösund Steel Work a walking beam furnace is used for slab reheating.
The furnace has very great energy consumption, about 30000 tons of oil per year, so it is advisable to improve automatic control of the furnace.
In order to understand the process and to get a model to apply an improved automatic control on, we have made a mathematical model, which simulate a part of the furnace.
The model is programmed in Pascal, and the simulations to verify it,is executed on a PDP 11/03.

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18T0
Mätningar och experiment på laborationsprocesser.
(Measurements and experiments on laboratory processes).

Referat (sammandrag)
26T0
This thesis describes studies of four different laboratory processes, a water tank system, an electrical servomechanism, an air-heater system and a water-heater system, which all are to form a new laboration in the basic course in Automatic Control.

For each process has, when needed, mathematical modelling been conducted and the model has, as far as possible, been confirmed by experiments.

In one to each process linked appendix, are suitable tasks suggested.

Referat skrivet av
Author

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