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Master's Theses in Automatic Control 1983-1984

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1984

Document Version:
Publisher's PDF, also known as Version of record

Link to publication

Citation for published version (APA):
Wittenmark, B. (Ed.) (1984). *Master's Theses in Automatic Control 1983-1984*. (Reports TFRT-4215). Department of Automatic Control, Lund Institute of Technology (LTH).

Total number of authors:
1

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Download date: 08. Jan. 2026

CODEN:LUTFD2/(TFRT-6015)/1-011/(1984)

MASTER THESES IN AUTOMATIC CONTROL 83/84

BJÖRN WITTENMARK

DEPARTMENT OF AUTOMATIC CONTROL
LUND INSTITUTE OF TECHNOLOGY

SEPTEMBER 1984

LUND INSTITUTE OF TECHNOLOGY
DEPARTMENT OF AUTOMATIC CONTROL
Box 725
S 220 07 Lund 7 Sweden

Document name
Master Thesis report

Date of issue
September 1984

Document number
CODEN:LUTFD/(TFRT-6015)/1-011/(1984)

Author(s)
Björn Wittenmark

Supervisor

Sponsoring organization

Title and subtitle

Master Theses in Automatic Control 83/84

Abstract

The report contains abstracts of Master Theses (examensarbeten) made at the Department of Automatic Control, Lund, during the academic year 83/84. During this year 7 theses were made by 8 students. Most of the theses are written in Swedish with an English abstract.

Key words

Classification system and/or index terms (if any)

Supplementary bibliographical information

ISSN and key title

ISBN

Language
English

Number of pages
11

Recipient's notes

Security classification

DOK. MENTDATABL :D RT 3/81

Distribution: The report may be ordered from the Department of Automatic Control or borrowed through the University Library 2, Box 1010, S-221 03 Lund, Sweden, Telex: 33248 lubbis lund.

1. INTRODUCTION

The education for civilingenjörsexamen (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 month of full time work. The thesis can be made individually or by two students together.

This report is a collection of the document pages of the theses completed during the academic year 1983/1984. During this time 7 theses were finished by 8 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 in cooperation with the industry or other departments at the university.

Further information concerning the results can be obtained from the Department of Automatic Control by contacting the advisor. The theses may be borrowed through your library service or from the following libraries in Sweden:

Linköpings Universitetsbibliotek
Svensktrycket, S-581 83 Linköping, Sweden

UB 2, Svenska Tryckavdeln.
Box 1010, S-221 03 Lund, Sweden

Stockholms Universitetsbibliotek
Svenska Tryckavdeln., S-106 91 Stockholm, Sweden

Kungliga Biblioteket
Box 5039, S-102 41 Stockholm, Sweden

Umeå Universitetsbibliotek
Box 718, S-901 10 Umeå, Sweden

Uppsala Universitetsbibliotek
Box 510, S-751 20 Uppsala, Sweden

2. LIST OF THESES

TFRT-5301 Ericsson I och Sjöstrand T: Reglerstrategier för vattenkraft (Control strategies for hydro power plants). April 1984

TFRT-5302 Hall L: Modellbyggnad och simulering av klimat i stallbyggnader (Dynamic modelling and simulation of barn climate). Sept 1983.

TFRT-5303 Knutsson S: En självinställande prediktor med operatörskommunikation skriven i Omsi-Pascal (A self-tuning predictor with operator communication written in Omsi-Pascal). Oct 1983.

TFRT-5304 Bengtsson B-Å: Simulering av produktflöden (Simulation of product flow). Oct 1983.

TFRT-5305 Beskow Ch: Working on the airbus A310 flight management computer system. Dec 1983.

TFRT-5306 Pourchafai Mohammad-Reza: Styrning av pelletmaskin (Control of pelleting machine). Dec 1983.

TFRT-5307 Johansson K: Ett exempel på robotpositering med hjälp av videokamera (An example of robot positioning using a video camera). Jan 1984.

3. LIST OF SUBJECTS

Subject	Thesis
Adaptive control	5303
Analysis and synthesis	5301, 5304, 5305, 5306
Computer graphics	5307
Digital control	5301
Modelling and identification	5302

4. DOCUMENT PAGES

The following pages contain the document pages of the theses. Most of the theses are written in Swedish with only an abstract in Enlish.

LUND INSTITUTE OF TECHNOLOGY
DEPARTMENT OF AUTOMATIC CONTROL
Box 725
S 220 07 Lund 7 Sweden

Document name
Master thesis

Date of issue
April 1984

Document number
CODEN:LUTFD2/(TFRT-5301)/1-070/(1984)

Author(s)
Ingvar Ericsson
Tony Sjöstrand

Supervisor
Björn Wittenmark

Sponsoring organization

Title and subtitle
Reglerstrategier för vattenkraftverk
(Control strategier for hydro power plants.)

Abstract

Hydro power stations are normally controlled by PID-controllers. One example is the Torsebro hydro power plant in Helge river. The Southern Sweden Power Supply (Sydkraft SB) Initiated a research project addressing the water level control problem of hydro power plants.

The goal of this master thesis was to investigate the level-control problem. Different control structures were analyzed like. PID-schemes, Feed-Forward compensators and Observers, based on Kalman filter techniques.

The thesis contains a description of the process, development of a dynamic simulation model represented in the SIMNON language, analytic studies of the sampled model and simulations using different control structures.

Compared to conventional design (PID), the Feed-Forward compensator structure gives a significant better performance. However, this structure assumes that the disturbances can be measured. Observer structures, are more related to reality and gives acceptable performance.

Key words

Classification system and/or index terms (if any)

Supplementary bibliographical information

ISSN and key title

ISBN

Language
Swedish

Number of pages
70

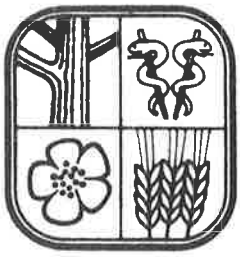
Recipient's notes

Security classification

DOKUMENTDATABLAD RT 3/81

Distribution: The report may be ordered from the Department of Automatic Control or borrowed through the University Library 2, Box 1010, S-221 03 Lund, Sweden, Telex: 33248 lubbis lund.

CODEN: LUTFD2/(TFRT-5302)/1-107/(1983)



SVERIGES
LANTBRUKSUNIVERSITET

MODELLBYGGNAD OCH SIMULERING AV KLIMAT I STALLBYGGNADER

JAN HALL

Handledare: Gustaf Olsson (LTH)
Gösta Gustavsson
Svante Olofsson (LBT)

Institutionen för lantbrukets byggnadsteknik (LBT)
Undervisningsavdelningen

Swedish University of Agricultural Sciences
Department of Farm Buildings
Division of Teaching

Examensarbete 48

Thesis

LUND 1983

ISSN 0348-0690
ISBN 91-576-1476-8

LUND INSTITUTE OF TECHNOLOGY
DEPARTMENT OF AUTOMATIC CONTROL
Box 725
S 220 07 Lund 7 Sweden

Document name
Master thesis

Date of issue
October 1983

Document number
CODEN:LUTFD2/(TFRT-5303)/1-064/(1983)

Author(s)
Stefan Knutsson

Supervisor
Jan Sternby

Sponsoring organization

Title and subtitle
En självinställande prediktor med operatörskommunikation skriven i Omsi-Pascal.
(A self-tuning predictor with operator communication written in Omsi-Pascal.)

Abstract

The thesis has been made in cooperation with Kockumation AB, Malmö. The task is to implement an adaptive predictor on a LSI-11.

The program is written such that all interesting parameters can be changed via the operator communication. The parameters of the model and variables are displayed on the terminal and are updated at each sampling interval. Further a curve can be displayed showing the prediction a number of sampling intervals ahead. The curve can be rescaled in order to give better resolution.

Key words

Classification system and/or index terms (if any)

Supplementary bibliographical information

ISSN and key title

ISBN

Language
Swedish

Number of pages
64

Recipient's notes

Security classification

DOKUMENTDATABLAD RT 3/81

Distribution: The report may be ordered from the Department of Automatic Control or borrowed through the University Library 2, Box 1010, S-221 03 Lund, Sweden, Telex: 33248 lubbis lund.

LUND INSTITUTE OF TECHNOLOGY
DEPARTMENT OF AUTOMATIC CONTROL
Box 725
S 220 07 Lund 7 Sweden

Document name
Master thesis

Date of issue
October 1983

Document number
CODEN:LUTFD2/(TFRT-5304)/1-054/(1983)

Author(s)
Bernt-Åke Bengtsson

Supervisor
Lars Pernebo., Björn Wittenmark

Sponsoring organization

Title and subtitle
Simulering av produktflöden.
(Simulation of product flow)

Abstract

An interactive computer program for design of plants via simulation of product flow in a dairy has been developed at ALFA-LAVAL in Lund. The users of the program have suggested a number of improvements in order to simplify the interaction between the program and the user. This report describes the decided solution strategy and how it has been inserted into the excisting program, and furthermore how a simulation will turn out using the new function.

At the end ofthe report is also a complete example of a simulation of a dairy, clearly giving the function of the program. The simulation is carried out in two steps, first with the old program routine and second with the new one.

Key words

Classification system and/or index terms (if any)

Supplementary bibliographical information

ISSN and key title

ISBN

Language
Swedish

Number of pages
54

Recipient's notes

Security classification

DOKUMENTDATABLAD RT 3/81

Distribution: The report may be ordered from the Department of Automatic Control or borrowed through the University Library 2, Box 1010, S-221 03 Lund, Sweden, Telex: 33248 lubbis lund.

LUND INSTITUTE OF TECHNOLOGY
DEPARTMENT OF AUTOMATIC CONTROL
Box 725
S 220 07 Lund 7 Sweden

Document name
MASTER THESIS

Date of issue
December 1983

Document number
CODEN:LUTFD2/(TFRT-5305)/1-060/(1983)

Author(s)
Charlotte Beskow

Supervisor
Björn Wittenmark

Sponsoring organization

Title and subtitle

Working on the Airbus A310 Flight Management Computer System

(Analys av flygfall med Airbus A310 Flight Management Computer System)

Abstract

The Flight Management Computer System project realizes the concept of letting a computer system guide an aircraft from the point of origin to the point of destination. The operational program of this computer strings a lateral and a vertical flight plan and then guides the aircraft through the different legs of the flight without pilot intervention.

The author of this report has been involved in the final development stage of this project. The report describes the testplans and methods used to fine tune the program. The report shows also different problems encountered during the testing.

Key words

Classification system and/or index terms (if any)

Supplementary bibliographical information

ISSN and key title

ISBN

Language
English

Number of pages
60

Recipient's notes

Security classification

Distribution: The report may be ordered from the Department of Automatic Control or borrowed through the University Library 2, Box 1010, S-221 03 Lund, Sweden, Telex: 33248 lubbis lund.

LUND INSTITUTE OF TECHNOLOGY
DEPARTMENT OF AUTOMATIC CONTROL
Box 725
S 220 07 Lund 7 Sweden

Document name
Master theses

Date of issue
December 1983

Document number
CODEN:LUTFD2/(TFRT-5306)/1-068/(1983)

Author(s)
Mohammad-Reza Pourchafai

Supervisor
Björn Wittenmark

Sponsoring organization

Title and subtitle
Styrning av pelletmaskin. (Control of pelletingmachine.)

Abstract

A conventional controller contains parameters which must be adjusted manually at the process. A selfptuning controller adjusts itself its parameters both at the installation and during the operation. ASEA AB has developed a self-tuning controller (ASEA NOVATUNE)

This report studies the possibilities of applying this technique on a pelleting process.
In the first part, the process is described. Later different proposals for controll strategies are discused. Finally some practical problems are mentioned. As an appendix the block-schemas of PC-program for NOVATUNE is given.

Key words

Classification system and/or index terms (if any)

Supplementary bibliographical information

ISSN and key title

ISBN

Language
Swedish

Number of pages
68

Recipient's notes

Security classification

Distribution: The report may be ordered from the Department of Automatic Control or borrowed through the University Library 2, Box 1010, S-221 03 Lund, Sweden, Telex: 33248 lubbis lund.

LUND INSTITUTE OF TECHNOLOGY
DEPARTMENT OF AUTOMATIC CONTROL
Box 725
S 220 07 Lund 7 Sweden

Document name
Master Thesis
Date of issue
jan 1984
Document number
CODEN:LUTFD2/(TFRT-5307)/1-030/(1984)

Author(s)
Kenneth Johansson

Supervisor
Lars Nielsen
Sponsoring organization

Title and subtitle
Ett exempel på robotpositionering med hjälp av videokamera.
(An example of robot positioning using a video camera.)

Abstract

A two wheeled robot is controlled using image information. The problem is to reach an arbitrarily placed goal, from an arbitrary starting position. The hardware consists of a videocamera, image memory with frame grabber, VAX-11/780, DA-converter and the robot (a toy turtle) moving on the floor.

The implementation consists of image processing, feature detection, correction of perspective, obstacle detection, route planning and control.

Key words

Classification system and/or index terms (if any)

Supplementary bibliographical information

ISSN and key title

ISBN

Language
Swedish

Number of pages
30

Security classification

Recipient's notes

Distribution: The report may be ordered from the Department of Automatic Control or borrowed through the University Library 2, Box 1010, S-221 03 Lund, Sweden, Telex: 33248 lubbis lund.

DOKUMENTDATABLAD RT 2/81