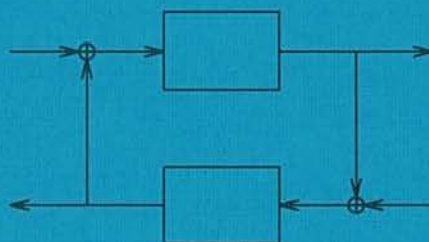


Final Program

9-th Benelux Meeting on Systems and Control

March 14 - 16, 1990
Veldhoven, The Netherlands

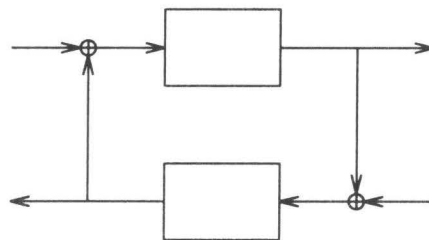


Centrum voor Wiskunde en Informatica
Amsterdam

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WELCOME

The Organizing Committee welcomes you to the *9-th Benelux Meeting on Systems and Control*, March 14-16, 1990 in Veldhoven, The Netherlands.

AIM

The aim of this meeting is to stimulate the research activities of researchers in systems and control active in the Benelux, and to stimulate the cooperation between these researchers. This meeting is the ninth in a sequence of annual gatherings which take place alternatingly in Belgium and The Netherlands.

SCIENTIFIC PROGRAM

Overview

- Plenary lectures by invited speakers
 - *Stochastic systems and the stochastic realization problem*,
G. Picci (University of Padova, Padova, Italy), Wednesday, session WD11.
 - *Stochastic realization, noncausal estimation, and the Riccati inequality*,
G. Picci, Friday, session FR11.
 - *Parallel algorithms and safety-critical standards*,
P.H. Welch (University of Kent, Canterbury, United Kingdom), Thursday, session TH11.
 - *Real-time control with transputers*,
A.W.P. Bakkers and J. van Amerongen (University of Twente, Enschede), Thursday, session TH31.
- Mini course *Robust control and H-infinity optimization*
 - *Robust control*,
H. Kwakernaak (University of Twente, Enschede), Wednesday, session WD21.
 - *H-infinity optimization*,
S. Weiland (University of Groningen, Groningen), Friday, session FR31.
- Contributed short lectures, see the list of sessions for the titles and authors of these lectures.

Remarks

For a contributed lecture 30 minutes are available. Please leave a few minutes of this period for discussion and room changes. Adhere to the indicated schedule. In this way concurrency between the parallel sessions is preserved and participants have the opportunity to change sessions between lectures. Thank you for your cooperation.

CONFERENCE LOCATION

The meeting takes place in the conference center 'De Koningshof' in Veldhoven, near Eindhoven. Accommodation is provided in the conference center. The center has a large number of lecture rooms, coffee corners, a bar, and recreational facilities. The atmosphere facilitates informal contacts.

Veldhoven is located about 6 km. west of Eindhoven. It may be reached by public transportation from the railway station of Eindhoven by bus 150 leaving Eindhoven at 12 and at 42 minutes after the hour during the main part of the day. The bus trip takes about half an hour. For the return trip the bus leaves the busstop near the conference center at 26 and at 56 minutes past the hour.

ORGANIZATION

The Organizing Committee consists of the following persons: D. Aeyels (RU Gent), P.P.J. van den Bosch (TU Delft), O.H. Bosgra (TU Delft), F. Eising (HSA B.V. Hengelo), C. Heij (EU Rotterdam), M. Kinnaert (ULB Bruxelles), H. Kwakernaak (UT Enschede), J.H. van Schuppen (CWI Amsterdam).

The following organizations sponsor the meeting:

- Netwerk Systeem- en Regeltheorie (Network System and Control Theory),
- Stichting Meet- en Besturingstechnologie (Foundation for Measurement and Control),
- Werkgemeenschap Mathematische Besliskunde en Systeemtheorie (Dutch Research Community in the Mathematics of Operations Research and System Theory),
- Afdeling voor Regeltechniek van het Koninklijk Instituut voor Ingenieurs (Division for Automatic Control of the Royal Institution of Engineers in The Netherlands),
- I.B.R.A.-B.I.R.A. Federation of Automatic Control,
- F.N.R.S.-N.F.W.O. Groupe de Contact Automatique.

The Organizing Committee thanks the Centrum voor Wiskunde en Informatica for its support for the organization of the meeting. In particular, it is grateful to mr. F. Sniijders for organizational matters and ms. G. Bijleveld for secretarial assistance.

MEETINGS

On Wednesday March 14 at 17:45 hours meetings are scheduled by the werkgemeenschappen (Research communities) of the Stichting Meet- en Besturingstechnologie. On the same day at 20:30 hours a meeting is scheduled by the Netwerk Systeem- en Regeltheorie. On Thursday March 15 at 18:15 hours a meeting is scheduled by the Stichting Meet- en Besturingstechnologie. Members of these bodies will be invited by the respective chairmen.

ADDRESSES

For communications regarding the Organizing Committee or the scientific program contact:

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LIST OF SESSIONS

List of sessions for Wednesday March 14

Session: WD00 Room: Grote Kongreszaal
OPENING

11:25 - 11:30

Welcome to participants

J.H. van Schuppen (Amsterdam)

Session: WD11 Room: Grote Kongreszaal

PLENARY LECTURE

Chair: J.H. van Schuppen (Amsterdam)

11:30 - 12:30

Stochastic systems and the stochastic realization problem

G. Picci (Padova)

Session: WD21 Room: Grote Kongreszaal

MINI COURSE - ROBUST CONTROL AND H-INFINITY OPTIMIZATION - PART 1

Chair: O.H. Bosgra (Delft)

13:45 - 14:30

Robust control - Part 1.A

H. Kwakernaak (Enschede)

14:45 - 15:30

Robust control - Part 1.B

H. Kwakernaak (Enschede)

Session: WD31 Room: 10

LINEAR SYSTEMS

Chair: A.J.J. van der Weiden (Delft)

16:00 - 16:30

The computation of the structure at infinity of structured descriptor systems

J.W. van der Woude (Amsterdam) and K. Murota (Tokyo)

16:30 - 17:00

State space methods for determining the pole-zero structure of a non-causal system

M. Kuijper (Amsterdam) and J.M. Schumacher (Amsterdam/Tilburg)

17:00 - 17:30

On open loop stabilizability

H. Zwart (Enschede)

Session: WD32 Room: Grote Kongreszaal

ROBUST CONTROL - 1

Chair: H. Trentelman (Eindhoven)

16:00 - 16:30

Robustness analysis for real and complex perturbations applied to electro-mechanical systems

M. Steinbuch (Eindhoven), J. Terlouw (Eindhoven/Delft), O.H. Bosgra (Delft), and S. Smit (Eindhoven/Delft)

16:30 - 17:00

H-infinity-control without assumptions on zeros on the imaginary axis

C. Scherer (Würzburg)

17:00 - 17:30

The discrete time H-infinity control problem with measurement feedback

A.A. Stoorvogel (Eindhoven)

Session: WD33 Room: 27

NONLINEAR CONTROL - 1

Chair: M. Kinnaert (Bruxelles)

16:00 - 16:30

Stabilization of nonlinear systems by means of dynamic output feedback

C. Delepaute (Louvain-la-Neuve)

16:30 - 17:00

Variable structure control and sliding motion

H.R. Visser (Delft)

17:00 - 17:30

Time-optimality in the control of human movements

R. Happee (Delft)

List of sessions for Thursday March 15

Session: TH11 Room: Grote Kongreszaal

PLENARY LECTURE

Chair: J. van Amerongen (Enschede)

09:00 - 10:00

Parallel algorithms and safety-critical standards

P.H. Welch (Canturbury)

Session: TH21 Room: 27

IDENTIFICATION METHODS

Chair: P.H.M. Janssen (Bilthoven)

10:30 - 11:00

Generalizations of the ordinary singular value decomposition: Structure and applications

B.L.R. de Moor (Leuven)

11:00 - 11:30

Modal reduction guided by Hankel singular value intervals

P.M.R. Wortelboer (Delft) and H. van Oostveen (Delft)

11:30 - 12:00

QSVD - based state space identification

M. Moonen (Leuven) and J. Vandewalle (Leuven)

12:00 - 12:30

Projection technique for the structure identification of MIMO systems

Zhang Zhiyong (Eindhoven)

Session: TH22 Room: 10

CONTROL APPLICATIONS

Chair: W.L. Koning (Delft)

10:30 - 11:00

The design of an optimal reduced-order temperature controller for a diffusion/LPCVD furnace

H. de Waard (Delft)

11:00 - 11:30

From identification to robust control and from theory to application

Y.C. Zhu ('s Hertogenbosch) and A.C.P.M. Backx ('s Hertogenbosch)

11:30 - 12:00

Active damping of a truss structure using piezoelectric actuators

A. Preumont (Brussels), J.-P. Dufour (Brussels), M. Sparavier (Brussels)

12:00 - 12:30

Predictive control of a windtunnel

A.R.M. Soeterboek (Delft), H.B. Verbruggen (Delft), P.P.J. van den Bosch (Delft)

Session: TH23 Room: 20

OPTIMAL CONTROL

Chair: A. Bagchi (Enschede)

10:30 - 11:00

Development of an efficient algorithm for the optimal control of nonlinear systems

B. Apraxine (Louvain-la-Neuve), M. Installé (Louvain-la-Neuve), and E. Loute (Louvain-la-Neuve)

11:00 - 11:30

A nonzero-sum game with variable final time

Margriet Klompstra (Delft)

11:30 - 12:00

Flexible management in regional land-use planning problems

Cao Dong (Louvain-la-Neuve) and M. Installé (Louvain-la-Neuve)

12:00 - 12:30

Tracking strategies for asymptotically admissible target paths in economic models

J.C. Engwerda (Tilburg)

Session: TH24 Room: Grote Kongreszaal

COMPUTER SCIENCE METHODS AND DISCRETE EVENT SYSTEMS

Chair: G.J. Olsder (Delft)

10:30 - 11:00

A geometric approach to the structural synthesis of multilayer perceptron neural network

J. Hao (Leuven), S. Tan (Leuven), and J. Vandewalle (Leuven)

11:00 - 11:30

AI in real-time control

A.J. Krijgsman (Delft)

11:30 - 12:00

A Petri-net representation of a manned bottling line

W.A. Blaauboer (Delft)

12:00 - 12:30

Properties of the imbedded Markov chain in random discrete event systems

R. de Vries (Delft)

Session: TH31 Room: Grote Congreszaal

PLENARY LECTURE

Chair: P.P.J. van den Bosch (Delft)

14:00 - 15:00

Real-time control with transputers

A.W.P. Bakkers (Enschede) and J. van Amerongen (Enschede)

Session: TH41 Room: 27

REALIZATION

Chair: C. Heij (Rotterdam)

15:30 - 16:00

Behaviours in continuous time

C. Praagman (Eindhoven) and J.M. Soethoudt (Eindhoven)

16:00 - 16:30

Dynamics described by second order differential equations

R.J.P. Schrama (Delft)

16:30 - 17:00

Realization and partial fractions

M. Kuijper (Amsterdam) and J.M. Schumacher (Amsterdam/Tilburg)

17:00 - 17:30

An approach of state-space realization in δ -operator

Li Gang (Louvain-la-Neuve), M. Gevers (Louvain-la-Neuve), and V. Wertz (Louvain-la-Neuve)

17:30 - 18:00

Statistics of MA estimation with Durbin's method

P.M.T. Broersen (Delft)

Session: TH42 Room: 10

ADAPTATION AND DETECTION

Chair: P.P.J. van den Bosch (Delft)

15:30 - 16:00

Adaptive control of mode-switch processes

R.A. Hilhorst (Enschede), J. van Amerongen (Enschede), P. Löhnberg (Enschede), and H.J.A.F. Tulleken (Amsterdam)

16:00 - 16:30

Modelling and model reference adaptive control for fed-batch bakers' yeast fermentation

P.F. Bögles (Eindhoven), A.G. de Jager (Eindhoven), and G. Reyman (Vlaardingen)

16:30 - 17:00

Structured unmodelled dynamics in MRAC

H. Butler (Delft)

17:00 - 17:30

Building physical knowledge into statistical models for fault detection and diagnosis

Jun Zhang (Amsterdam)

17:30 - 18:00

Real-time fault diagnosis support

N. Tholen (Delft)

Session: TH43 Room: Grote Kongreszaal

ROBOTICS

Chair: G. Campion (Louvain-la-Neuve)

15:30 - 16:00

Control of a pending two-link flexible robot arm

L. Kruse (Enschede), J. van Amerongen (Enschede), P. Löhnberg (Enschede), and M.J.L. Tierneho (Breda)

16:00 - 16:30

Robust-performance control of an RRR-robot

F.G. de Boer (Delft)

16:30 - 17:00

Coupled bending and torsional vibrations of flexible beams: Modeling and simulation

M. Vajta (Enschede), J. van Amerongen (Enschede), P. Löhnberg (Enschede), and M.J.L. Tierneho (Breda)

17:00 - 17:30

Modeling and feedback control of a flexible arm for prescribed frequency-domain tolerances

M. Kelemen (Enschede) and A. Bagchi (Enschede)

17:30 - 18:00

A new approach for on-line path planning and generation for robots in non-static environments

H.R. Piccardo (Delft)

Session: TH44 Room: 20

LAST MINUTE SUBMISSIONS

Chair:

15:30 - 16:00

Locked discrete event systems

R. Smedinga (Groningen)

16:00 - 16:30

The use of Riemannian metrics for identification and approximation

R.L.M. Peeters (Amsterdam)

16:30 - 17:00

Prediction error method for identification of a heat exchanger

Ren Qingchang

17:00 - 17:30

STEPS: Software for identification of ill-defined systems

J.D.J. Waardenburg (Enschede), K. Keesman (Enschede)

List of sessions for Friday March 16

Session: FR11 Room: Grote Kongreszaal

PLENARY LECTURE

Chair: J.C. Willems (Groningen)

09:00 - 10:00

Stochastic realization, noncausal estimation, and the Riccati inequality

G. Picci (Padova)

Session: FR21 Room: 27

MODELLING APPLICATIONS

Chair: T. Schilperoort (Marknesse)

10:30 - 11:00

Uncertainty analysis of mathematical models: An application to the soil-acidification model RESAM

P.H.M. Janssen (Bilthoven), H. Kros (Wageningen), W. de Vries (Wageningen), and C. Bak (Bilthoven)

11:00 - 11:30

Dynamics of a single stage bio-reactor treating an inhibitory substrate (Phenol)

G.Y. Adusei (Enschede), G. van Straten (Enschede), H. van den Beld (Enschede)

11:30 - 12:00

Application of identification methods to a 600 MW power plant

J. Heintze (Delft) and H. Aling (Delft)

12:00 - 12:30

Identification of an experimental XY-table

M.J.G. van de Molengraft (Eindhoven), F.E. Veldpaus (Eindhoven), J.J. Kok (Eindhoven)

Session: FR22 Room: 10

ROBUST CONTROL -2

Chair: M. Steinbuch (Eindhoven)

10:30 - 11:00

A time-domain approach to H-infinity worst-case design

M.A. Peters (Eindhoven)

11:00 - 11:30

H-infinity controller design with robustness margins

P.M.M. Bongers (Delft)

11:30 - 12:00

Bandwidth and robustness limitations due to right half plane poles and zeros

M. Kinnaert (Brussels)

12:00 - 12:30

Robust stabilization in the gap-topology

L.C.G.J.M. Habets (Eindhoven)

Session: FR23 Room: Grote Kongreszaal

NONLINEAR CONTROL - 2

Chair: D. Aeyels (Gent)

10:30 - 11:00

When is a nonlinear system a precompensated linear system?

H. Nijmeijer (Enschede)

11:00 - 11:30

Dynamic disturbance decoupling for nonlinear systems

H. Huijberts (Enschede), H. Nijmeijer (Enschede), and L.L.M. van der Wegen (Enschede)

11:30 - 12:00

Nonlinear model matching: From linearity to nonlinearity

H. Huijberts (Enschede)

12:00 - 12:30

New results in the triangular decoupling problem (TDP) for nonlinear control systems

A.C. Ruiz (Enschede) and H. Nijmeijer (Enschede)

Session: FR31 Room: Grote Kongreszaal

MINI COURSE - ROBUST CONTROL AND H-INFINITY OPTIMIZATION - PART 2

Chair: H. Kwakernaak (Enschede)

13:45 - 14:30

H-infinity optimization - Part 2.A

S. Weiland (Groningen)

14:45 - 15:30

H-infinity optimization - Part 2.B

S. Weiland (Groningen)

SCHEDULES

Schedule for Wednesday March 14

Time	Sessions and speakers		
11:25-11:30	WD00 Opening		
11:30-12:30	WD11 Plenary lecture G. Picci		
12:30-13:45	Lunch Break		
13:45-14:30	WD21 Mini course - Part 1.A - H. Kwakernaak		
14:30-14:45	Break		
14:45-15:30	WD21 Mini course - Part 1.B - H. Kwakernaak		
15:30-17:00	Break		
	WD31 Linear systems	WD32 Robust control - 1	WD33 Nonlinear control - 1
16:00-16:30	Van der Woude et al.	M. Steinbuch et al.	C. Delepaute
16:30-17:00	M. Kuijper et al.	C. Scherer	H.R. Visser
17:00-17:30	H. Zwart	A.A. Stoorvogel	R. Happee
17:30-17:45	Break		
17:45-18:45	Meetings		
19:00-20:30	Dinner		

Schedule for Thursday March 15

Time	Sessions and speakers		
09:00-10:00	TH11 Plenary lecture P. Welch		
10:00-10:30	Break		
	TH21 Identification methods	TH22 Control applications	TH23 Optimal control
10:30-11:00	B.L.R. de Moor	H. de Waard	B. Apraxine et al.
11:00-11:30	P.M.R. Wortelboer et al.	Y.C. Zhu et al.	M. Klompstra
11:30-12:00	M. Moonen et al.	A. Preumont et al.	Cao Dong et al.
12:00-12:30	Zhang Zhiyong	A.R.M. Soeterboek et al.	J. Engwerda
	TH24 Computer systems		
10:30-11:00	J. Hao et al.		
11:00-11:30	A.J. Krijgsman		
11:30-12:00	W.A. Blaauboer		
12:00-12:30	R. de Vries		
12:30-14:00	Lunch break		
14:00-15:00	TH31 Plenary lecture J. van Amerongen and A.W.P. Bakkers		
15:00-15:30	Break		
	TH41 Realization	TH42 Adaptation and detection	TH43 Robotics
15:30-16:00	C. Praagman et al.	R.A. Hilhorst et al.	L. Kruise et al.
16:00-16:30	R.J.P. Schrama	P.F. Bögles et al.	F.G. de Boer
16:30-17:00	M. Kuijper et al.	H. Butler	M. Vajta et al.
17:00-17:30	Li Gang et al.	Jun Zhang	M. Kelemen et al.
17:30-18:00	P.M.T. Broersen	N. Tholen	H.R. Piccardo
	TH44 Last minute submissions		
15:30-16:00	R. Smedinga		
16:00-16:30	R.L.M. Peeters		
16:30-17:00	Ren Qingchang		
17:00-17:30	J.D.J. Waardenburg et al.		
18:00-18:15	Break		
18:15-19:15	Meeting		
19:30-21:00	Dinner		

Schedule for Friday March 16

Time	Sessions and speakers		
09:00-10:00	FR11 Plenary lecture G. Picci		
10:00-10:30	Break		
	FR21 Modelling applications	FR22 Robust control - 2	FR23 Nonlinear control - 2
10:30-11:00	P.H.M. Janssen et al.	M.A. Peters	H. Nijmeijer
11:00-11:30	G.Y. Adusei et al.	P.M.M. Bongers	H. Huijberts et al.
11:30-12:00	J. Heintze et al.	M. Kinnaert	H. Huijberts
12:00-12:30	M.J.G. van de Molengraft et al.	L.C.G.J.M. Habets	A.C. Ruiz et al.
12:30-13:45	Lunch break		
13:45-14:30	FR31 Mini course - Part 2.A - S. Weiland		
14:30-14:45	Break		
14:45-15:30	FR31 Mini course - Part 2.B - S. Weiland		
15:30-15:45	Tea and coffee		