# CONTENTS

Foreword v

International Program Committee vi

APMS'96 Welcome Address on Behalf of IFIP WG 5.7 vii
E. Eloranta

## Invited Speakers

A. Rolstadås

*Productivity Issues in the Future Enterprise – Conclusions and Recommendations from the TOPP Program*

H. Yoshikawa

*Establishing an Academic Domain*

G. Doumeingts and Y. Ducq

*Production Management: Which Future ?*

T. Ito

*Recent Trends of New Product Development and Production Management in Japanese Electronics Industries*

## Next Generation Manufacturing Systems

T. Kurihara, P. Bunce and J. Jordan

*Next Generation Manufacturing Systems (NGMS) in the IMS Program*

T. Förster and S.F. Schmelzer

*Requirements for Dynamic Production Structures in a Turbulent Environment – Dynamic Production and Organization Structures*

S. Kawata, S. Kawai, S. Matsunaga and S. Kawada

*Discrete/Continuous Hybrid Simulation for Autonomous Distributed Manufacturing System Using Scene Transition Net*

J. Vaario and K. Ueda

*Biological Concept of Self-Organization in Flexible Automation Systems*

S. Fujii, H. Morita, Y. Tatsuta and Y. Takata

*A Basic Study on High Volume Flexible Manufacturing System for Agile Manufacturing*

D.H. Müller, K. Oestermann and S. Klöcker

*Ecological and Economical Evaluation of Technical Products in Early Stages of Mechanical Design*

M.D.T. Williamson and R.L. Storch

*The Collaborative Engineering Process within the Framework of the Virtual Enterprise*
Human Oriented Production Management
H. Yuki, H. Saito, A. Mizowaki, H. Imai, T. Kaihara and K. Tarui 55
_Work-Flow Management System with Virtual Manufacturing Model 'Shinchoku Sakusen Ban'

C. Møller 59
_Interorganizational Communication Systems: Towards a New Research Framework in Logistics and Production Management

S. Nishimura, M. Kishi, K. Yokotani, H. Matsuura, H. Furutate and K. Tsukamoto 65
_Human Sensory Evaluation Systems for Total Product Life Cycle

J. Goossenaerts, H.J. Pels and H. Wortmann 71
_A Research Portfolio for Product Life Cycle Modelling and Execution Service Engineering

D. Purwadi and K. Tanaka 77
_The Role of Human Resource Planning in Japanese Production Management

S. Augustin and U. Müller-Steinfahrt 81
_How to Create a Learning Supply Chain in Industry: Concepts, Methods, Experiences

Measures of Effectiveness and Decision Support Systems
E.E. Karsak 87
_An Options Approach to Valuing Flexibility in Flexible Manufacturing Systems Investments

W.-M. Chow 93
_Purpose-Built Equipment Production

Marimin, L. Herlina, A. Aulia, M. Umano, I. Hatono and H. Tamura 97
_Expert System for New Product Strategy Development

J.L. Cano, R. Rebollar, A. Romanos, J.C. Yubero and P. Bruna 103
_Implementing PM Philosophy in a Group of Small Engineering-to-Order Oriented Companies: GTM Case

_Kitchen Planning Support System Employing Kansei Engineering and Virtual Reality

Process Planning
S. Butdee, J. Wang, W.C.K. Wong and L. Ma 111
_A Real-Time Process Planning System Using Case-Based Reasoning

A.S. Kleshchev, V.V. Kryssanov, Y. Fukuda and K. Konishi 115
_CAPP Expert System Building Technology: Logical Approach

E. Bartezzaghi, G. Spina and R. Verganti 121
_Time Drivers and Systemic Process Re-Engineering: A Methodology and an Application

F. Oba, T. Murayama and D. Ma 127
_Integrated Production Management for Production Planning, Loading and Scheduling
# Benchmarking

A.-W. Scheer  
*Benchmarking Business Processes*

D.G. Smith  
*Creativity in Selecting Benchmarking Partners*

J. Knopp and J.O. Riis  
*Using Benchmarking for Innovative and Incremental Changes*

H. Wildemann  
*Performance Analysis through Benchmarking and Recognition of Patterns*

V. Hornung and M. Oster  
*Virtual Benchmarking in Logistics: A Concept for the Determination of Benchmarks*

I.P. Tatsiopoulos, T. Katsikas and F. Clave  
*A Benchmarking Model for the Customer Order Flow in Semi-Processing Industries*

W.P. Lewis  
*Problems in Benchmarking New Product Development in Small to Medium Size Enterprises*

# Integration in Manufacturing

J.B. Elejabarrieta  
*MRP-3 Concurrent Integration of Planning and Scheduling in OKP*

J.M. van de Mortel-Fronczak and J.E. Rooda  
*On the Integral Modelling of Control and Production Management Systems*

M.J. Verweij and A.J.R. Zweegers  
*Analysis and Design of Production and Control Structures*

H. Zhang and G. Zülch  
*General Modeling of Order Processing in Continuous Production Systems*

G. Zülch and B. Brinkmeier  
*Method for the Shaping of Process-Oriented Organizational Structures of Production Systems*

A. Bartolotta and M. Garetti  
*Object-Oriented Representation of Manufacturing Systems: Trends and Perspectives*

Y. Nishioka, S. Nakasuka and K. Hori  
*Knowledge Representation for Conceptual Design Concerning with a Product and Manufacturing Processes*
Optimization

N. Hirabayashi and H. Nagasawa
A Method for Facility Layout with Alternative Processing Routes 205

S.A. Feyzbakhsh, M. Matsui and K. Itai
Optimal Design of a Generalized Conveyor-Serviced Production Station: Fixed and Removal Item Cases 209

T. Honiden
A Clustering Approach to the Layout Problem in Cellular Manufacturing Systems 215

V.E. Krivonozhko and B.V. Nemchinov
Formulation and Solution of Production Planning Problems for Flexible Manufacturing Systems 221

T. Dohi and S. Osaki
The Optimal Policy for an Economic Manufacturing Model with Stochastic Machine Breakdown and Repair 225

J.H.Y. Yeung, W.C.K. Wong and L. Ma
The Effects of Multiple Freeze Fences on Customer Service Level in MRP Systems 231

Just-In-Time

M. Asano and H. Ohta
Scheduling with Shutdowns and Sequence Dependent Setup Times under Just-In-Time Environment 237

H. Aigbedo
On the Multi-Staging Heuristic for Determining Product Sequences for Just-In-Time (JIT) Final Assembly Lines 243

M. Kojima, K. Ohno and K. Nakashima
Performance Evaluation of a JIT Production System 249

K. Takahashi and N. Nakamura
Reactive JIT Ordering Systems for Unstable Demand Changes 255

Games for Production Management

H. Vanmaele and H. Muller(-Malek)
DIC-XIM, a Computer Based Simulation Game for the Holistic Optimization of Physical Distribution and Inventory Systems 261

P. Haho and R. Smeds
Benefits from Using Simulation Games in Business Process Development: Experiences from a Finnish Manufacturing Company 267

A. Nicholson
Interactive Learning: Using the Design, Run, Evaluate Cycle 273

J.O. Riis, R. Smeds, J. Johansen and H. Mikkelsen
Games for Organizational Learning in Production Management 277
Next Generation Production Management

T. Saito, S. Akifuji, H. Majima and H. Tsuji
Business Process Connection in Workflow Management Systems

F. Biennier, J. Favrel and J.P. Denat
Collaborative Autonomous Control

An Agent Based Control System for a Model Factory

I. Dean and A. Carrie
Future Enterprise Types and Strategies for Agile Manufacture

W. Sihn
Paradigm Shift in the Corporation : the Fractal Factory

Production Management Aspects in IMS

Manufacturing System Aggregating Real Model and Virtual Model

H. Blomgren
Why Production is not an Internal Affair : Out and Insourcing, IT, and It’s Effects on Production and Supply Systems

M. Furukawa, M. Watanabe, A. Mizoe, T. Watanabe and Y. Kakazu
Evolutionary Computation Applied to the Logistic CIM System

B. Karlson
Concurrent Engineering: Why Communication Alone Won’t Do the Trick

J.O. Riis and J. Knopp
Implementing New Production Management Modes : Orchestration of Simultaneous Improvement Activities

L.T. Almeida and A.V. Fernandes
Cost-Benefit Analysis in Complex Production Environments : An Application to Concurrent Engineering

Y. Tanimizu, N. Sugimura, K. Iwata and M. Onosato
A Study on Model Architecture of Computer Integrated Manufacturing System

Material Management and Inventory

U. Seppälä and J.-M. Lehtonen
Planning the Location of Facilities in a Supply Chain

M. Perona
The Effects of Safety Stock and Lot Size in Perturbed MRP Environments

T. Tateno, T. Fushino, M. Igoshi and S. Aomura
A Virtual Assembly Environment Considering Parts Fixing Concept

M. Enomoto, H. Matoba, H. Morita and T. Segawa
Production Planning System Coping with Changing Customer Requirements

J. Jahnukainen and M. Lahti
Efficient Order Processing in Make-to-Order Supply Chains
Software Engineering in Manufacturing
H. Mase, H. Tsuji, H. Kinukawa, Y. Hosoya, K. Koutani and K. Kiyota
Experimental Simulation for Automatic Patent Categorization
Z. Zesheng and S. Ling
Design and Implementation of an Advanced Stored Grain Management System
M. Hori and T. Yoshida
SCOOT: An Object-Oriented Framework for Production Scheduling Systems
S. Umeda
An Object-Oriented System Model for Manufacturing Enterprises Information System
M.G. Jensen
A Practical Approach towards a Product-Oriented Production Structure in Order to Decentralize the Planning Task
A. Inamato
Modeling of Object Behavior and Scheduling in Production Workflow

Management of Decentralized Production
E. Scherer
Autonomy and Integration in Decentralized Production
W. Wincheringer and M. Miklavec
Report-Based Knowledge Management in Decentralized Production Structures
B.E. Hirsch, T. Kuhlmann, R. Lamping and C. Massow
DECOR - An Infrastructure to Support Decentralized Production Management
G. Neubert and J.-P. Campagne
New Management Systems: Towards Proactive Factories
M. Minagawa and Y. Kakazu
Acquiring Decentralized Control Strategy for Cellular Warehouse
H. de Haas, J.O. Riis and H.-H. Hvolby
Centralized and Decentralized Control: Finding the Right Combination

Strategic Aspects
S. Schwarze and P. Schönsleben
Recent Developments in the Configuration of Multiple-Variant Products: Application Orientation and Vagueness in Customer Requirements
H. Hübner
The Ecology-Driven Service (R)Evolution: The Product Longevity Approach and its Consequences for Production and Corporate Management
J. Olhager and B. Cimander
The Impact of Manufacturing Strategy on the Design of Production Management Systems: An Exploratory Study
M. Hartmann and C. Borgmann
**Strengthening the Linkage of Strategy with Operations in Decentralized Units – Dynamic Production and Organization Structures**

A.K. Kochhar and Y.T. Abdul-Hamid
**Knowledge Systematization for the Selection of Assembly System Configurations**

T. Tanskanen, P. Buhanist and H. Lanning
**Ideals and Facts about Teams**

H.-H. Hvolby and J. Trienekens
**Future Challenges for Production Control Systems – A Comparison of the Food Industry with the Iron Industry**

G. Doumeingts, S. Kleinhans and N. Malhéné
**GEM TIME : A Proposal for an Evolution Management Methodology**

### Production Scheduling

**Embedding a Mathematical Scheduling System to a Traditional Works**

H. Nagamochi, K. Mochizuki and T. Ibaraki
**Complexity of the Single Vehicle Scheduling Problem on Graphs**

Y. Ikkai, E. Yano, T. Ohkawa and N. Komoda
**Plan Modification by Relaxation Search Method**

K. Morizawa and H. Nagasawa
**A Multiobjective Jobshop Scheduling Method Using Complex Random Sampling**

C. Shing and H. Nagasawa
**An Interactive Stochastic Multiobjective Scheduling System**

H.-P. Wiendahl, J.-W. Breithaupt and T. Wahlers
**Production Planning and Control on the Basis of Control Theory**

H. Shin and M. Kuroda
**An Autonomous Job Shop Scheduling System under Dynamic Production Environment Considering Machine Breakdowns**

N. Sugimura, T. Moriwaki and K. Hozumi
**A Study on Holonic Manufacturing Systems and Application to Real Time Scheduling Problems**

I. Hatono, T. Nishiyama, M. Umano and H. Tamura
**Performance Evaluation of Distributed Real-Time Scheduling Systems Using Distributed Production System Simulator**

B. Lu, H. Kubo and H. Sugimoto
**Application of GA to Scheduling Problem Using Repetitive Bit Replacing Method (2-OPT)**

S. Katoh, M. Yagiura and T. Ibaraki
**Application of Genetic Algorithms to the Single Machine Scheduling Problem under Changing Environment**
T. Kawakami and Y. Kakazu
A Study on GA-Based Reactive Planning Systems of Robot Manipulators 547

H. Tamaki, T. Mukai, K. Kawakami and M. Araki
Genetic Algorithm Approach to Multi-Objective Scheduling Problem in Plastics Forming Plant 553

M.F. Sebaaly and H. Fujimoto
Integrated Planning and Scheduling for Multi-Product Job-Shop Assembly Based on Genetic Algorithms 557

T. Gohtoh, K. Ohkura and K. Ueda
An Application of Genetic Algorithm with Neutral Mutations to Job Shop Scheduling Problems 563

A. Abada, Z. Binder and P. Ladet
A Boltzmann Machine for Solving Job Shop Scheduling Problem 569

T. Watanabe and Y. Hashimoto
Job-Shop Scheduling Forecasting Margins to Due-Dates Based on a Neural Network 573

E. Corradi, A. Portioli and M. Taisch
Hybrid Production Control Strategies : A Comparison Between Algorithmic and Neural Based Techniques 579

I. Kebbe, H. Yokoi, K. Suzuki and Y. Kakazu
Vibrational Potential Method for Large-Scale Scheduling Problems 585

S. Cavaleri and M. Taisch
Neural Networks in Hybrid Intelligent Manufacturing Systems 591

H. Hase and N. Okino
A Synthesized Chart for Scheduling of Production Systems with AGV 597

N. Konishi, Y. Nakagawa, H. Nishida and N. Sakai
A MIP-Based Approach to the Cutting Stock Problem for Roll and Long Strip Materials with Minimum Production Amount Constraint 603

K. Asada, K. Kumamoto, Y. Nakagawa and N. Fujii
Cell Sequencing Approach to Multi-Stage Production Scheduling 609

J. Cheng and H. Kise
Scheduling for an Automated Three-Machine Flowshop Manufacturing System 615

M. Siota and S. Manabe
Solution of the Problem for a Large Scale Integrated Plan in the Iron and Steel Production Control 621

V.F. Cavalcante and C.A.S. Passos
Asynchronous Teams for Scheduling Problems in Chemical Plants 627

H. Suwa, S. Fujii and H. Morita
An Acquisition of Scheduling Rules for Flow Shop Problems 631

J. Dorn, M. Girsch and N. Vidakis
Déjà Vu – A Reusable Framework for the Construction of Intelligent Interactive Schedulers 637

R. Lau and J. Favrel
Learning in an Intelligent On-Off Scheduling Agent 645

G. Comby, F. Biennier, A. Nader and J. Favrel
Robust Scheduling According to Release and Due Dates 649
International Panel on Manufacturing Strategy and Case Studies in Production Management

D.R. Probert

International Technology Management: What Relevance to the Choice of Manufacturing Process Technology?

G.X. Yang and X.B. Zheng

Lean Production – New Production Mode

N. Kurosu and T. Miyatani

Visual Management: Applying the TLSC to System Planning

J. Lee

Remote Manufacturing System

Author Index