

# Editorial

## Guest Editors

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The Advanced Summer Institute, ASI' 2000 was co-organised with IiMB-WG (Integration Manufacturing & Beyond). It was the seventh such event that was organised under the auspices of the ESPRIT Network of Excellence (NOE) in Intelligent Control and Computer Integrated Manufacturing Systems the ICIMS-NOE. ASI'2000 was held in Bordeaux, between 18-20 September 2000 and it happened to be a very successful joint event. The main theme of ASI'2000 was "Life Cycle Approaches to Production Systems: Management, Control, Supervision".

This special issue of the Journal presents outstanding papers of ASI'2000. The proceedings of ASI'2000 has more than 80 papers that were all presented at the conference. After a careful selection among all the papers, authors of the significant papers were asked to rework them and resubmit and after a thorough review process, 10 papers were accepted for publication.

This special issue covers a number of significant articles addressing the areas of:

- Knowledge Management
- Process Planning
- Process Control
- Shop Floor Control
- Simulation Studies
- Design Decision Support and Decision Making

The first paper "Barriers in Knowledge Management and Pragmatic Approaches" (Thoben *et al.*) addresses the issue of knowledge as the cognitions and abilities used by individuals and organisations to handle difficult problems. The Knowledge Management is the structuring of knowledge that suffers from barriers posted by humans, organisational and technological issues. These barriers are described in the paper and some pragmatic approaches based on highly participative of employees are introduced and proved to overcome successfully these barriers.

The paper "Leading evolution by decreasing defensive behaviour" (Malhene *et al.*) focuses on the concept of learning within organisations, which exclusively depends on human factors. The method with which new knowledge is spreading inside organisations is extensively discussed and a new approach for the successful introduction and implementation of training programmes for SMEs is proposed.

The paper "Developing A Theory of Design-A Tentative Approach Using Mathematics" (Chen and Doumeingts) presents a new approach for the mathematical formalisation of the designing procedure for manufacturing systems. The approach is based on the explicit representation of artefacts, which is the heart of the designing, and knowledge with the identification of the three fundamental design processes: the analysis, synthesis and refinement. An illustrative example shows the proposed new design procedure and the results are verifiable and repeatable.

The paper "Multi Agent Based Control of Manufacturing Flow Shops" (McFarlane *et al.*) presents the application and design of multi-agent systems for distributed shop floor control. An infrastructural mechanism based on pheromone approach is described that allows the propagation of information throughout a plant topology in order to be available for the co-ordination and decision making agents. New algorithms from queuing theory are utilized to develop an extension to the routing control system.

The software environment and the algorithms that have been developed are tested for a simple example of an automobile paint plant proving the advantages of the proposed approach.

The paper "A methodology of Discrete-Event Simulation of manufacturing Systems: An overview" (Groumpos and Merkurjev) proposes a new structure for simulation studies of Manufacturing systems. It is based on Discrete-Event simulation cases and the optimisation of simulation procedures is thoroughly examined. Two simulation examples with results are proving the significance and usefulness of the proposed method.

The paper "System Dynamics: Analysis and Decision-Making Process of Human Resources Management Problem" (Topintzi *et al.*) introduces the use of System Dynamics, a branch of management science dealing with the dynamics and controllability properties of systems in modelling the Human Resource Management System. Simulation results are performed for different scenarios for the case of consulting company proving the merit of the proposed method.

The paper "Operation Sequencing in Nonlinear Process Planning: local Search Heuristics" (Lee *et al.*) examines the problem of simultaneous selecting and sequencing the required operations with the minimizing of the objective cost such as the operation processing and machines costs and the set-up and changing tool cost. It considers a nonlinear process planning, for which the problem is described using a formal description for the objective function. A solution algorithm is proposed to minimize the function and then heuristics search are implemented using the initial solution algorithm and the operation selection algorithm is analysed. An interesting simulation example implementing six heuristics, four annealing algorithms and two tabu search algorithms is illustrated and compared in the paper.

The paper "Design of Hierarchical Intelligent Control System of Complex Chemical-Technological Process" (Vasilyev *et al.*) presents a new design approach for Complex Chemical Processes based on Active Expert System. A new Hierarchical Multi-Level System is proposed integrating different Control strategies that improve the Chemical Technological Process resulting in increasing the process quality and safety.

The paper "Machine Vision based measurement and control of Zinc Flotation Circuit" (Kartinen and Koivo) presents a closed loop controller that is introduced to improve the process control of mineral flotation. The paper presents how machine vision equipment can be utilized to obtain quantitative information and how this information is used for on-line control of the flotation process. The paper presents simulation results on the controller that was developed based on the vision information how the financial cost for the process can be minimized.

The last paper "Design of Decision Support Systems for Extended Enterprise" by Zolghadri *et al.* presents a practical approach for the design of Decision Support Systems based on the GRAI methodology, which is an enterprise modelling methodology. An overall analysis of the Decision Makers Information Environment is presented and leads to the design and implementation of a DSS. The proposed design approach utilizes a system modelling and identification of all information needed for decision-making process and the real data exchanges within the Decision Support Panel.

With this collection of papers we intended to give a flavour of the exciting things that took place during ASI'2000 and at the same time to provide a glimpse at what is currently happening in the lively field of knowledge based systems and intelligent decision support. We take the opportunity to thank the Editor F. Filip for providing the International Journal of Studies in Informatics and Control as a forum, the editorial staff of the journal for all their efforts and of course the people who made ASI'2000 possible.