Editorial

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Biographical notes: V.K. Jain received his BE degree from M.A.C.T. Bhopal. He received his MTech and PhD from University of Roorkee. He has about 40 years of teaching and research experience. He has served as a Visiting Professor at the University of California at Berkeley (USA) and University of Nebraska at Lincoln (USA). Currently, he is Emeritus Fellow (after retiring as a Professor) at Indian Institute of Technology Kanpur. He has around 300 publications to his credit. He has written/edited seven books. He has various research areas of interest, viz. advanced machining processes (ECM, EDM, AFM, MAF, MRAF, and others), machining of advanced engineering materials, shear strain acceleration phenomenon in metal cutting, and CAPP.

P.K. Jain is a Professor in the Department of Mechanical and Industrial Engineering at I.I.T. Roorkee. He received his PhD from I.I.T. Roorkee and post doctorate degree from Japan. His research interests include CAD/CAM, CAPP, concurrent engineering: design for manufacture and assembly, tolerance design, manufacturing systems, modelling and simulation, FMS, CMS, RMS, scheduling, operations management, capacity planning, loading and scheduling, resource planning, machining science, conventional and unconventional, and surface engineering. He has published several research papers and articles in various national and international journals and conferences of repute. He has guided several PhD theses. He also received several prestigious awards from various national and international bodies for recognition of his academic career.

In today's global competitive market, areas such as design, process planning, manufacturing and inspection play a vital role in reducing cost and lead time. The major challenge arises with the integration of all these sub areas to achieve a common goal in computer-integrated manufacturing (CIM) environment. Process planning and scheduling activities have a dominant effect not only on resource utilisation and meeting the due dates, but also on the overall profitability of any enterprise.

Computer-aided process planning is considered a bridge between design and manufacturing as it translates design specifications into manufacturing process details. Because of some new arenas of manufacturing paradigm like distributed and intelligent

manufacturing, the importance of integrated CAPP systems has been recognised. Therefore, there is an urgent need for the integration of process planning and scheduling, and for that matter the entire production system. Also, to render off the limitations of traditional approach towards manufacturing it becomes the need of hour to formulate and implement a strategy that would integrate both process planning and scheduling which may be termed as integrated process planning and scheduling (IPPS). An integrated approach can react better than traditional approach to impart manufacturing environment with pronounced degree of profitability, flexibility, resource utilisation, realistic delivery dates and formation of reasonable process plans that can readily be executed without recurrent alterations.

The research on integrated CAPP systems will continue to dominate this era of competitive manufacturing world. Apart from addressing the well established unsolved issues, this integrated system would definitely make early in roads for the multifarious and exciting nature of the problems that will always create a centre of attention and fascinate researchers. New technologies and tools will continue to be evolved, developed, tested and hopefully adopted in real time environment with special focus on artificial intelligence and integrated manufacturing. As the new manufacturing era is characterised by mass customisation, there are high degree of customer's expectations with prime focus on quality, and an effective and efficient supply chain. In order to inculcate these requirements, the CAPP systems will have to become more integrated, adaptive, agile and distributed. Also, too much emphasis on environmental consideration makes it mandatory and important to equip these integrated CAPP systems with energy and environmental considerations as well. Aiming on the future directions of research on integrated CAPP systems, this special issue of *IJIMS* chooses five research papers which address pertinent issues related to CAPP and its integration with other functions like scheduling.

The first paper entitled 'Shuffled frog leaping algorithm approach to employee timetabling and job shop scheduling' by G. Ramya and M. Chandrasekaran proposes a novel job scheduling approach integrated with employees time tabling. The objective of this integrated approach is to minimise labour costs, maximise the completion time and improve employee satisfaction. The developed framework consisted of two levels; the first provides a feasible production schedule for job-shop scheduling problem based on heuristic algorithm known as a shuffled frog leaping algorithm. In the second part, the developed technique is applied on industrial case studies.

The second paper entitled 'Effect of problem size on the performance of constructive algorithms for flow shop scheduling problems with sequence dependent setup times' by Rajesh Vanchipura and R. Sridharan proposes two algorithms for scheduling problems. The performance of the developed algorithms was analysed with respect to the problem size which takes into account parameters like number of jobs and number of machines. The analysis reveals the performance of the algorithm with respect to the problem size.

In third paper entitled 'Multi-objective flexible job shop scheduling using hybrid differential evolution algorithm' by G. Balaraju, Sriram Venkatesh and B. Siva Prasad Reddy, is a multi objective scheduling problem that has been solved using a hybrid evolutionary algorithm. The multiple objectives include minimisation of make-span, total machine load and critical machine load. The hybrid approach is based on NSGA, and it is tested on a set of standard flexible job shop scheduling problems reported in literature.

The fourth paper entitled 'Part family formation for reconfigurable manufacturing system using K-means algorithm' by Ashutosh Gupta, Pramod K. Jain and Dinesh Kumar proposes a part family formation methodology for newer class of manufacturing system like reconfigurable manufacturing system. The algorithm is based on integrated similarity coefficient and agglomerative hierarchical K-means technique for grouping part into families. In this paper, based on minimum cost model a methodology for sequential selection of part families for production is also proposed.

The last paper entitled 'An expert system for selection of process parameters and strip layout design for production of deep drawn sheet metal parts' by Vishal Naranje and Shailendra Kumar deals with the optimal selection of process parameters for deep drawing of sheet metal parts. An expert system has been developed which selects appropriate values of process parameters and design of strip-layout for production of deep drawn parts on progressive deep drawing die. The modelled expert system is capable to model blank layout and strip-layout automatically in the drawing editor of AutoCAD.

We hope that these papers will be useful for the readers of the *IJIMS*. We would also like to thank the authors and reviewers of this special issue, for their help and cooperation in bringing out this special issue. We are grateful to the organisers of AIMTDR-2012 Conference who shouldered this responsibility of the special issue to the Guest Editors. Finally, we are grateful to the Editor-in-Chief, Prof. Tin-Chih Toly Chen of *International Journal of Internet Manufacturing and Services* for inviting us as the Guest Editors of this special issue. We also appreciate the help and cooperation extended by Liz Harris, Jim Corlett, and Darren Simpson.