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## **Preface**

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### **Guest Editor: Kalevi Huhtala**

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**Biographical notes:** Kalevi Huhtala born in 1957, he is Professor (Mobile hydraulics, since 2003) of the Institute of Hydraulics and Automation (IHA) at Tampere University of Technology (TUT). He graduated as Dr. Tech. in 1996. His current research focuses on the hydraulics and control of the wireless and digitally controlled mobile machines and on the hydraulics of diesel engines. The latter area includes common rail diesel fuel injection systems and electrohydraulically operated valve trains.

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Nowadays a great deal of interest is focused on the improvements of the behaviour of mobile machines. The actuators of these well-known machines are normally driven hydrostatically. The hydraulic system has several advantages; for example, high power/weight ratio, stiffness and controllability. The intelligence of machines means that there is a more sophisticated control. Many of the solutions, which have been used in the car industry, are nowadays being applied to working machines. This means more sensors and more sophisticated control. There are also other approaches available; for instance, new research methods like CFD calculation, and new innovative solutions. By means of CFD, the fluid flow through the hydraulic components or systems can be optimised. In this special issue, the papers concentrate on the following items.

The paper by Tikkanen and Vilenius, 'Control of dual hydraulic free piston engine' deals with the control of the hydraulic free piston engines (HFPE). The HFPE is one example of an innovative solution in the field of mobile technology. It combines the combustion engine and the hydraulic pump into one unit.

The paper by Li and Liu, 'Online fuzzy logic control for tipover avoidance of autonomous redundant mobile manipulators' deals with the investigation of a redundant autonomous mobile manipulator. The dynamic model of the robot was established. Also, the study was completed with the experiments, which verified the model and proposed algorithm.

The paper by Ivanov et al., 'Intelligent control for ABS application with identification of road and environmental properties', discusses the conceptual solutions for intelligent algorithms of anti-lock braking systems. This paper is a good example of the common interests which car and working machine industry share.

The paper by Shahmirzadi et al., 'Intelligent vs. sliding mode control in rollover prevention of tractor-semitrailers' shows how an algorithm inspired by Brain Emotional Learning (BEL) is used to control a simulated model of a tractor-semitrailer. In this paper, the BEL based algorithm is shown to enhance the performance of the system in

terms of smoother vehicle roll and yaw performance, limited excursions of the vehicle roll angle, as well as cheaper control actions.

The last paper by Zhu and Patankar, ‘Multiple parameter estimation using Gram-Schmidt Orthonormalization for brushless DC motor actuators’, deals with a multi-parameter estimation method based on Gram-Schmidt Orthonormalization in a continuous function space of feedback signals.