

Foreword

In the recent years the interest of the scientific community in intelligent industrial systems grows. However knowledge in this field remains fragmented and several textbooks in the areas of information sciences and engineering treat the problems, an industrial systems' engineer has to handle, in an incomplete way. Most existing publications in the areas of robotic and industrial systems focus on control problems. In some cases, issues which are significant for the successful operation of industrial systems, such as modeling and state estimation, sensorless control, or optimization, fault diagnosis, intelligence and adaptive behavior are omitted. Thus engineers and researchers have to search at different sources to obtain this information. One can find several books that treat separately each one of the previous topics. However there are only a few books which follow an interdisciplinary approach in the design of intelligent industrial systems and which use in a complementary way results and methods from the above research fields.

IGI's book on "*Intelligent Industrial Systems: Modeling, automation and adaptive behavior*" analyzes current trends in industrial systems design, such as intelligent industrial and mobile robots, complex electromechanical systems, fault diagnosis and avoidance of critical conditions, optimization, and adaptive behavior. The book treats topics and contains examples from areas of major interest for engineers and researchers, such as industrial and mobile robotics, stochastic modeling for industrial systems, electric power systems and fault diagnosis.

The chapters that follow can provide material for courses addressed to undergraduate and postgraduate students of engineering. The book's content can be complementary to automatic control and robotics courses, giving emphasis to industrial systems design through the integration of control, estimation, fault diagnosis, optimization and machine intelligence methods. It can also be a background reference for engineers and researchers who aim at providing robotic and industrial systems with intelligence, autonomy and adaptive behavior. Engineers and researchers in the areas of industrial systems will benefit from the book's analysis on a wide range of problems, such as: modeling and control of industrial robots, modeling, and control of mobile robots and autonomous vehicles, modeling and robust/adaptive control of electromechanical systems, estimation and sensor fusion based on measurements obtained from distributed sensors, fault detection/isolation and machine intelligence for adaptive behavior. For all these reasons the book can be considered as a useful contribution in the existing bibliography on intelligent industrial systems.

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Gerasimos Rigatos received a diploma in Electrical and Computer Engineering (1995) and Ph.D. (2000), both from the National Technical University of Athens (NTUA), Greece. In 2001 he was a post-doctoral researcher at the Institut de Recherche en Informatique et Systèmes Aléatoires, in Rennes, France, while in 2007 he was an invited professor (maître des conférences) at Université Paris XI Orsay, Institut d'Electronique Fondamentale. Since 2002 he holds a researcher position at the Industrial Systems Institute, in Patras, Greece (Senior Researcher since 2007). In 2008 he was elected assistant professor at the Department of Electrical and Computer Engineering of the National Technical University of Athens (Decree 407/80). His research interests include robotics and control, fault diagnosis, computational intelligence and adaptive systems. He is a member of IEEE and of the Technical Chamber of Greece.