

Preface

Aim of Book

The aim of this book is to provide to its readers an exposition and a summary of research results of control of distributed and of multilevel/hierarchical systems. The chapters are based on research for the C4C Project which was sponsored by the European Commission. The chapters of the book cover case studies and theory.

The case studies of the project include the following distributed systems: control of underwater vehicles as available at the University of Porto, control of aerial vehicles, control of road networks with a traffic control center, control of straddle carriers transporting containers on the floor of a container terminal, and control of a high-speed printer with many local sensors and actuators.

In regard to theory, the book focusses attention on the integration of control, information and communication, computation, verification, and related aspects of engineering and of computer science.

The book originated from an extended technical report written for the project officer of the C4C Project and for the three anonymous reviewers of the project.

The authors of the report are researchers who have been involved in the C4C Project or were affiliated with the teams of the C4C Project.

Style of Parts and Chapters

The book is structured into parts with chapters each having its own research topic. The titles of the parts reflect the organization of the project and the various control architectures considered.

The chapters of the book have the character of essays of at most eight pages. An essay is a short text with a focus on a problem, concepts, the main body of the relevant theory, a discussion of research issues, and finally suggestions for further reading. Due to their special character, several chapters are longer than eight pages.

The motivation for the choice of chapters in the form of essays follows. Long chapters quickly make a book unreadable for most readers. But an essay can be read by a knowledgeable reader of engineering or of mathematics in about 15 minutes. After reading one essay, the reader can go on to other essays. With the table of contents, each reader can chart her or his own route through the book.

C4C Project

The book also describes partly the results of the Project *Control for Coordination of Distributed Systems* (CON4COORD and C4C, both acronyms are used) which was sponsored by the European Commission via Grant Agreement INFSO-ICT-223844. The lifetime of the project was 1 May 2008 till 1 September 2011. The participants of the project are the following organizations:

- Centrum Wiskunde & Informatica (CWI), in Amsterdam, The Netherlands.
- The research center CERETETH at the University of Thessaly, Volos, Greece.
- The Faculty of Technology, Policy, and Management of the Delft University of Technology in Delft, The Netherlands.
- The Faculty of Mechanical Engineering of the Eindhoven University of Technology in Eindhoven, The Netherlands.
- The Department of Electrical and Computer Engineering of the University of Cyprus in Nicosia, Cyprus.
- The Department of Electrical Energy, Systems, and Automation, of Ghent University in Ghent, Belgium.
- The Faculty of Engineering of the University of Porto in Porto, Portugal.
- The Department of Computer Science of the University of Verona in Verona, Italy.
- The company PSA Antwerp (formerly Hesse-Noord Natie) in Antwerp, Belgium.
- The company Ocean Scan–Marine Systems Technology in Porto, Portugal.
- The company Océ Technologies in Venlo, The Netherlands.
- The company Trinité Automation B.V. in Uithoorn, The Netherlands.

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