

Lecture Notes
in Control and Information Sciences 363

Editors: M. Thoma, M. Morari

Gildas Besançon (Ed.)

Nonlinear Observers and Applications

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Library of Congress Control Number: 2007931052

ISSN print edition: 0170-8643

ISSN electronic edition: 1610-7411

ISBN-10 3-540-73502-X Springer Berlin Heidelberg New York

ISBN-13 978-3-540-73502-1 Springer Berlin Heidelberg New York

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Typesetting: by the authors and SPS using a Springer L^AT_EX macro package

Printed on acid-free paper SPIN: 12087648 89/SPS 5 4 3 2 1 0

Preface

This book basically gathers the material of the 28th Grenoble International Summer School on Control, dedicated to "Nonlinear observers and applications", organized within the Control Systems Department (former *Laboratoire d'Automatique de Grenoble*) of the newly formed GIPSA-lab research center, and hosted by the "Maison Jean Kuntzmann" of the IMAG Institute, in September 2007.

The motivation for this school and the present book is twofold: on the one hand, the observer problem is undoubtedly crucial in control systems, and on the other hand there are not so many comprehensive documents on this topic. The present one does not claim to be exhaustive, but can give a good idea on the problem, on the possible tools to get solutions, and on various applications. Its spirit basically follows from the pioneering studies which took place in particular in Grenoble in the early eighties, and the subsequent developments, owing a lot to Guy Bornard and his coworkers. In particular, a general overview on observer tools for nonlinear systems is here proposed, focuses on high gain and adaptive gain techniques are given, as well as immersion and optimization-based approaches. Some applications in control and fault or parameter estimation are finally discussed.

I am grateful to all the contributors for their participation in this project.

Dr A. Voda, associate professor in the GIPSA-lab research center, and who has been in charge of the annual organization of high-level summer schools in Grenoble for quite a few years now, is to be sincerely thanked for her help and suggestions in the organization of this 28th event. The school and the book edition are also supported by the French research center C.N.R.S, research ministry M.E.N.R.T., and polytechnical institute I.N.P. Grenoble, while the school practical organization strongly relies on the administrative staff of the GIPSA-lab control systems department. In particular, my warm thanks go here to Mrs Marie-Thérèse Descotes-Genon and Mrs Marie-Rose Alfara.

June 4th 2007

Saint-Martin d'Hères,
Gildas Besançon

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