

Preface

The present special issue of *Control and Cybernetics* contains papers based on some of the lectures given during the joint CIMPA/GDR/TEMPUS-JEP intensive school

Shape Optimal Design, Theory, Application and Software

held in Warsaw, July 3-7 and 10-14, 1995.

The school was meant to present and discuss different aspects of shape optimization and optimal design of structures as well as related topics in modelling, control and sensitivity analysis of systems described by partial differential equations.

The first part of the school was organized at the Systems Research Institute of the Polish Academy of Sciences. The second part – at the International Banach Center of the Institute of Mathematics of the Polish Academy of Sciences. The school was supported by:

- the French Groupement de Recherche "Optimisation de forme" supported by the French CNRS,
- TEMPUS No. S_JEP-07228-94 "Shape Optimisation: Applications and Environment" supported by the European Cooperation fund on behalf of the Commission of the European Community,
- CIMPA (International Center for Pure and Applied Mathematics) and CIMI (International Center for Mathematics and Informatics) partially supported by UNESCO
- International Banach Center.

Organizing institutions in Poland include:

- Systems Research Institute of the Polish Academy of Sciences,
- Institute of Fundamental Technological Research of the Polish Academy of Sciences,
- International Banach Center at the Institute of Mathematics of the Polish Academy of Sciences,

and in France:

- C.N.R.S. - GDR Conception de Forme et Calcul Scientifique.

Countries participating in the Structural Joint European Project Grant TEMPUS No. S_JEP-07228-94 include France, Denmark, Italy and Poland.

The programme of the school was prepared by the Organizing Committee: M. Masmoudi (University of Toulouse), Z. Mróz (Polish Academy of Sciences), B. Rousselet (University of Nice), J. Sokołowski (University of Nancy and Polish Academy of Sciences)

Lectures were delivered by invited speakers coming from Brasil, Canada, Denmark, France, Germany, Poland, Russia, Switzerland and USA. The list of speakers with e-mail addresses is enclosed below. There were about 50 participants of the school from the above countries and the Czech Republic.

The lectures presented both the new results and the state-of-the-art reviews. They covered selected aspects of shape optimization and optimal design, mathematical models in material sciences, and some of the associated numerical issues. They concerned mainly the following topics:

- existence and uniqueness of solutions to shape optimization problems,
- homogenisation methods in optimal topology design,
- design sensitivity and optimal design of plates, shells, frames, etc.
- applications of shape optimization to equations of mathematical physics (e.g. elasticity, thermoelasticity, electromagnetics, fluid dynamics, free boundary problems, contact problems),
- numerical methods (like finite element methods, finite volume methods, integral equations),
- nonlinear programming and global optimization for nonconvex problems,
- sensitivity analysis of optimization problems,
- optimal control of distributed parameter systems,
- modelling and identification techniques for partial differential equations.

Some of participants of the school presented also papers at the session on "Shape optimization" during the IFIP Conference on "Modelling and Optimization of Distributed Parameter Systems with Applications to Engineering", which took place in Warsaw on July 17th-21st, and was organized by the Systems Research Institute of the Polish Academy of Sciences within the activities of the IFIP Working Group WG 7.2. A selection of these contributions was published in the special issue 2, 1996 of the journal *Applied Mathematics and Computer Sciences*.

The technical organisation of the school was assumed by Dr. Andrzej Kałuszko from the Systems Research Institute, by the staff of the Banach Center, and by Mme Guglielmetti for the French participants.

The list of speakers included:

- Pierre Aubert (paubert@math.unice.fr),
- Marc Bonnet (bonnet@athena.polytechnique.fr),
- Tadeusz Burczyński (burczyns@zeus.polsl.gliwice.pl),
- Carlo Cinquini (godipmec@icl382.cilea.it),
- Michel Delfour (delfour@CRM.UMontreal.CA),
- Krzysztof Dems (dems@lodz1.p.lodz.pl),
- Philippe Destuynder (St-Cyr-l'Ecole, France),
- Giles Francfort (francfor@ann.jussieu.fr),
- Andrzej Garstecki (garstecki@put.poznan.pl),
- Philippe Guillaume (guillaum@cict.fr),
- Abderrahmane Habbal (habbal@math.unice.fr),
- Eric Hassold (Eric.Hassold@sophia.inria.fr),
- Antoine Henrot (henrot@vega.univ-fcomte.fr),
- Jose Herskovits (jose@com.ufrj.br),
- Alexander Khludnev (khlud@hydro.nsk.su),

- Zenon Mróz (zmroz@spnamk1.ippt.gov.pl),
- Michel Pierre (pierre@loria.fr),
- Murali Rao (rao@math.ufl.edu),
- Jacques Rappaz (rappaz@ama.epfl.ch),
- Jean Roche (roche@iecn.u-nancy.fr),
- Bernard Rousselet (br@math.unice.fr),
- Ekkehard Sachs (sachs@uni-trier.de),
- Marc Schoenauer (Marc.Schoenauer@polytechnique.fr),
- Jan Sokółowski (Jan.Sokolowski@loria.fr),
- Jerzy Waśniewski (na.wasniewski@na-net.ornl.gov).

It is hoped that the Readers will find this volume interesting and that it will also constitute a useful contribution to the domain.

Jan Sokółowski

Guest Editor

e-mails: sokolows@ibspan.waw.pl or sokol@iecn.u-nancy.fr

