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The Seventh International Conference on

Vibration Problems
ICOVP 2005

05-09 September 2005, İstanbul, Turkey

Edited by

Esin İnan
İşık University, İstanbul, Turkey

and

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Springer
The Seventh International Conference on

Vibration Problems

ICOVP-2005

Editors

Esin İnan
Ahmet Kırıṣ

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Abbreviations:
GL = general lectures, RC = research communications
The Seventh International Conference on Vibration Problems (ICOVP-2005) took place in Şile Campus of İşık University, İstanbul, Turkey, between the dates 5-9 September 2005. First ICOVP was held during October 27-30, 1990 at A.C. College, Jalpaiguri under the co-Chairmanship of two scientists, namely, Professor M. M. Banerjee from the host Institution and Professor P. Biswas from the sister organization, A. C. College of Commerce, in the name of “International Conference on Vibration Problems of Mathematics and Physics”. The title of the Conference was changed to the present one during the third conference.

The Conferences of these series are:

2. ICOVP-1993, 4-7 November 1993, A.C. College, Jalpaiguri- India
3. ICOVP-1996, 27-29 November 1996, University of North Bengal, India
5. ICOVP-2001, 8-10 October 2001, (IMASH), Moscow, Russia
6. ICOVP-2003, 8-12 September 2003, Tech. Univ. of Liberec, Czech Republic
7. ICOVP-2005, 5-9 September 2005, İşık University, Şile, İstanbul, Turkey

The General Lecturers of ICOVP-2005 have been personally invited by the International Scientific Committee, which this time comprised the following members:

*Nuri AKKAS* (Turkey), *Yalçın AKÖZ* (Turkey), *Orhan AKSOĞAN* (Turkey), *Fikret BALTA* (Turkey), *M. M. BANERJEE* (India), *Victor BIRMAN* (USA), *Paritosh BISWAS* (India), *Bikas K. CHAKRABARTI* (India), *Hilmi DEMİRAY* (Turkey), *Ali Ünal ERDEM* (Turkey), *Ragıp ERDÖL* (Turkey), *Aybar ERTEPINAR* (Turkey), *K. V. FROLOV* (Russia), *Avadis HACINLIYAN* (Turkey), *xv*
Richard B. HETNARSKI (USA), Koncay HÜSEYİN (Canada), Esin İNAN (Chairperson, Turkey), S. M. KAPLOUNOV (Russia), Faruk KARADOĞAN (Turkey), Nahit KUMBASAR (Turkey), J. MAZUMDAR (India), Yalçın MENGİ (Turkey), Nikita MOROZOV (Russia), Natasha MOVCHAN (UK), Abhijit MUKHERJEE (India), Jiri NAPRSTEK, (Czech Republic), J. RAAMACHANDRAN (India), G. A. ROGERSON (UK), J. ŠKLIBA (Czech Republic), T. R. TAUCHERT (USA), Melih TEYMÜR (Turkey), A. TONDL (Czech Republic), Şenol UTKU (USA), F. VERHUST (The Nederlands), H. I. WEBER (Brazil), Vebil YILDIRIM (Turkey).

The General Lecturers (GL) who kindly accepted our invitation and delivered a lecture in ICOVP-2005 are:

Professor M. M. BANERJEE (Asanson, India)
Professor B. CHAKRABARTI (Saha Institute, Calcutta, India)
Professor A. CHERKAEV (Utah University, Salt Lake City, USA)
Professor M. ÇEBİ (USGS, Menlo Park, CA, USA)
Professor H. DEMİRAY (İşik University, İstanbul, Turkey)
Professor H. ECKER (Institute for Machine Dynamics, Vienna, Austria)
Professor M. ERDİ (Bogaziçi University, Istanbul, Turkey)
Professor A. MEHTA (National Centre for Basic Sciences, Calcutta, India)
Professor A. B. MOVCHAN (University of Liverpool, Liverpool, UK)
Professor Y. NATH (NIT, New Delhi, India)
Professor R. NORDMANN (Technical University, Darmstadt, Germany)
Professor M. OKROUHLIC (Academy of Science, Dolejskova, Czech Republic)
Professor J. RAAMACHANDRAN (IIT, Madras, India)

The Chairperson, Esin İnan (İşik University) has been supported by the Local Committee including her colleagues O. Aksoğan (Çukurova University) and H. Demiray (İşik University).

As with the earlier Conferences of the ICOVP series, the purpose of ICOVP-2005 was to bring together scientists with different backgrounds, actively working on vibration problems of engineering both in theoretical and applied fields. The main objective did not lie, however, in reporting specific results as such, but rather in joining different languages, questions and methods developed in the respective disciplines and to stimulate thus a broad interdisciplinary research. Judging from the lively discussions, the friendly, unofficial and warm atmosphere, both inside and outside Conference rooms, this goal was achieved.
The following broad fields have been chosen by the International Scientific Committee to be of special importance for the ICOVP-2005:

**TOPIC 1.** Mathematical models of vibration problems in continuum mechanics,
**TOPIC 2.** Vibration problems in non-classical continuum models and wave mechanics,
**TOPIC 3.** Vibrations due to solid / liquid phase interaction,
**TOPIC 4.** Vibration problems in structural dynamics, damage mechanics and composite materials,
**TOPIC 5.** Analysis of the linear / non-linear and deterministic / stochastic vibrations phenomena,
**TOPIC 6.** Vibrations of transport systems,
**TOPIC 7.** Computational methods in vibration problems and wave mechanics,
**TOPIC 8.** Vibration problems in earthquake engineering,
**TOPIC 9.** Vibration of granular materials,
**TOPIC 10.** Active vibration control and vibration control in space structures,
**TOPIC 11.** Vibration problems associated with nuclear power reactors.

Other topics concerned with vibration problems, in general, were open as well, but it was understood that the bulk of presentations were within the above fields. All of the lecturers were carefully “nominated” by the International Scientific Committee, so as to illustrate the newest trends, ideas and the results.

Altogether there were 81 active participants from 11 different countries, who presented 13 “general lectures (GL)” 1 Special Talk and 59 “research communications (RC)”, of which 49 were oral presentations and 10 were posters. Each GL was 50 minutes long, including questions and discussion, while each oral RC was 20 minutes long, including questions and discussion. The posters were exhibited throughout the 5 days of the Conference. There was ample time and opportunity for private discussions. Many private scientific meetings and interactions took place. Hopefully these will lead to new collaborations and other research developments in the coming years.

It is indicated in the Table of Contents (TOC) the character of each presentation, i.e., GL or RC. In the case of more than one author, the name of the presenting author is underlined in the TOC. At the end of this volume, there appears a list of all the presenting participants, along with addresses, both postal and e-mail. An Author Index (AI) is also included to the end of this volume; all the manuscript authors appear in it along with the page number(s) where their article(s) begins. The presenting author is always indicated by underlining their names. Authors not actually participating in or present at the symposium are marked in the Author
Index (AI) by an asterisk.

All lectures delivered at the Conference are recorded in this volume with the full text.

It is real pleasure to express our sincere gratitude to the people and organizations for their contributions, help and support for this Conference. In the first place, I have to mention here that it would not be possible to organize this symposium without the support of the İşık University. The full support, understanding and encouragement of Prof. Ersin Kalaycıoğlu, the Rector of the İşık University, were made the life easy for us. Secondly the support of the Faculty of Arts and Sciences was immeasurable and the staff of the Dean’s office and my secretary, Ms. Filiz Özsobacı were really worked very hard. I am very grateful to all of them.

On the other hand, I would like to express my deep gratitude to the members of The International Scientific Committee for their valuable and vitalizing ideas, comments, suggestions, and criticism on the scientific program of the Conference.

It is with great pleasure and gratitude that we acknowledge the support of The Technical and Scientific Research Council of Turkey -TÜBİTAK- which made possible to publish this Proceeding and also to give a small contribution to some of the General Lecturers who could not get any financial support from their own Institutes and to cover some part of their travel and local expenses of the participants coming from India, Russia and the former Soviet Union Countries.

Finally, we would like to send our cordial thanks to all lecturers for their excellent presentations and careful preparation of the manuscripts.

We are looking forward to come together at 5th ICOVP conference, which will tentatively take place in India in 2007.

Esin İnan, Chairperson
Arıköy, Istanbul, January 2006