CONFERENCE ON DIFFERENTIAL EQUATIONS AND THEIR APPLICATIONS, BRNO, AUGUST 25 – 29, 1997

Equadiff 9
CD ROM

edited by

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EQUADIFF 9 • MASARYK UNIVERSITY BRNO 1998

Preface

The tradition of the Czechoslovak Equadiff conferences dates back to 1962 when Equadiff 1 was organized in Prague. In addition to 160 domestic participants it was attended by 75 foreign ones. Subsequent conferences held in Bratislava (1966, 1981, 1993), Brno (1972, 1985) and Prague (1977, 1989) turned Equadiff into the world's oldest series of comprehensive conferences on differential equations and belong at present to the most important and biggest conferences of this kind.

The Conference on Differential Equations and Their Applications Equadiff 9 was held in Brno, August 25–29, 1997. It was organized by the Masaryk University, Brno in cooperation with Mathematical Institute of the Academy of Sciences, Technical University Brno, Union of Czech Mathematicians and Physicists, Union of Slovak Mathematicians and Physicists and other Czech scientific institutions with support of the International Mathematical Union. Equadiff 9 was attended by 269 participants from 32 countries and more than 50 accompanying persons and other guests.

Equadiff 9 was prepared by the Organizing Committee presided by F. Neuman, chairman, J. Vosmanský, executive secretary, Z. Došlá, head of the Equadiff Office, and other members J. Diblík, O. Došlý, J. Franců, J. Kalas, J. Kuben, Z. Pospíšil and J. Šimša.

The scientific program was prepared by the Scientific Committee. It consisted of the following Czech and Slovak mathematicians: P. Drábek, J. Haslinger, J. Jaroš, J. Kačur, J. Milota, J. Nečas, F. Neuman (chairman) and † M. Zlámal. The invited speakers have been proposed by the international Honorary and Advisory Board, consisted of R. P. Agarwal, I. Babuška, V. E. Barbu, P. Brunovský, W. N. Everitt, A. Friedman, J. K. Hale, W. Jäger, I. T. Kiguradze, K. Kirschgässner, J. Kurzweil (honorary chairman), V. Lakshmikantham, I. Marek, J. Mawhin, J. Nečas, M. Ráb, K. Rektorys, M. Švec, R. Temam, W. L. Wendland and † M. Zlámal.

The scientific program comprised 8 plenary lectures and 34 main lectures in the following sections:

1. Ordinary differential equations,
2. Partial differential equations,
3. Numerical methods and applications.

In addition 208 papers were presented

a) as communications in simultaneous subsections (112),
b) at the poster session (31),
c) in the form of enlarged abstracts (65).

Besides the scientific program the participants could enjoy a rich social program.

On the occasion of the Equadiff 9 Conference the series of publications have been prepared in various forms. The electronic hypertext form of all the materials can be found now on this Equadiff 9 CD ROM. It contains the usual conference materials distributed in the hard copy form at the beginning of the Conference (Program and Abstracts & Enlarged Abstracts) as well as papers, presented at the Conference.

The following items have been prepared:

- **Proceedings of Equadiff 9**, containing 12 survey papers mainly by the plenary speakers published by the Electronic Publishing House in both electronic and hard copy forms,
- **Equadiff 9 issue of Archivum mathematicum** (Tomus 34, 1998, No. 1, 232 pp.) containing 20 papers by invited speakers. The hard copy is also available at the Managing Editor of AM, the electronic form on the Internet http://www.emis.de/journals/AM/.
- **Equadiff 9 Papers**, containing 31 contributions accepted for the presentation at the Conference and submitted for publication in the electronic form on the Equadiff 9 CD ROM by the authors. A great part of them is in the final form and will not be published elsewhere, the others are preliminary versions or overview articles.

The complete CD ROM is also available on the Internet

http://www.math.muni.cz/Equadiff9CDROM/.

All participants are provided with the Equadiff 9 CD ROM, the hard copy of Equadiff 9 issue of AM and Proceedings; the authors of all contributions also with the hard copies of their papers.

Our aim was to harness the possibilities of new computer technologies and for this reason all Equadiff 9 publications were prepared in the hypertext PDF form. We hope that this form of publication will be accepted favourably.

Brno, June 1998 Editors

Equadiff 9 Conference in pictures

The Equadiff 9 Conference was held in Brno (Pic. 1) on the campus of the Brno Technical University (Pic. 2, 3, 4, 5, 6).

The Conference was opened during the nice and hot weather (Pic. 7) on Monday, August 25 by Prof. E. Schmidt, rector of the Masaryk University (Pic. 8) in the presence of Prof. P. Vavřín, rector of the Technical University (Pic. 9), Prof. J. Kurzweil, President of the Union of Czech Mathematicians and Physicists and Honorary Chairman of the Conference (Pic. 10), Prof. B. Riečan, President of the Union of Slovak Mathematicians and Physicists (Pic. 11), and other honorary guests of the Conference (Pic. 12, 13, 14). Prof. K. Szeged, Head of the Mathematical Institute of the Czech Academy of Sciences, presented Prof. F. Neuman with the Bolzano medal, an honor awarded to distinguished scientists by the Presidium of the Czech Academy of Sciences on the occasion of his sixtieth birthday (Pic. 15).

The first plenary lecture *Seventy-five years of global analysis around the forced pendulum equation* was delivered by Prof. J. Mawhin (Pic. 16, 17). The lecture included some interesting pictures (Pic. 18).

The lectures and communications were held in the main hall (Pic. 19, 20, 21) and the new building of the Faculty of Electrotechnical Engineering and Informatics (Pic. 22, 23, 24, 25), where the Conference Office was also situated (Pic. 26, 27, 28, 29, 30, 31).

On Monday evening, the Welcome Party was prepared (Pic. 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55).

On Tuesday, the rector of Masaryk University and the director general of IBC (Pic. 56, 57) opened the Glass of Wine (Pic. 58, 59, 60, 61, 62). The Concert of the Moravian Chamber Orchestra followed (Pic. 63, 64, 65).

During the Conference, the Mayor of Brno JUDr. D. Lastovecká and Vicemayor RNDr. P. Duchoň (Pic. 66) granted an audience to a group of Equadiff 9 participants (Pic. 67, 68, 69, 70, 71).

On Wednesday afternoon several trips were arranged.

On Thursday, the participants had the possibility to climb the top of the highest building in Brno, the Faculty of Mechanical Engineering (Pic. 72, 73, 74, 75, 76).

The Conference was closed with a Farewell Party (Pic. 77), where the Brno Radio Orchestra of Folk Instruments (BROLN) played. The Organizing Committee has the pleasure to present all the participants of Equadiff 9 Conference with a BROLN CD.

Authors of photographs: P. Janíček, V. Řičánek, J. Franců, J. Mawhin, M. Nakano, J. Vosmanský.

Using this CD ROM

In the following text, you will learn what is necessary so that you can use this CD ROM, what you will find on it, and how you can view it.

Hardware and software requirements

A computer with CD ROM drive is necessary (PC 386 or better, Macintosh, graphical station etc.) with an operating system for which Adobe Acrobat Reader exists (OS/2 Warp 3.0 or later, Windows 3.1 or 3.11, Windows 95 or NT, Mac OS 7.0 or later, unix with X Window etc.). Unfortunately, DOS by itself is not sufficient. A graphical adapter and monitor supporting at least 65536 colors are recommended.

Contents of Equadiff 9 CD ROM

If you insert the CD ROM into the drive and switch to it, you will find three directories:

acroread — contains Adobe Acrobat Reader for various operational systems.

equadiff — contains Conference materials in PDF.

photos — contains 77 photographs from Equadiff 9 in TIFF.

Installing Acrobat Reader

Adobe Acrobat Reader is a free software for displaying files in Portable Document Format (PDF). It exists for various operational systems and in several language versions. You can find it at

`ftp://ftp.adobe.com/pub/adobe/acrobatreader/`

or at many local mirrors. On this CD ROM you will find English versions 3.0 for all main operating systems. If you do not have Acrobat Reader installed as yet, follow the next instructions:

1. Insert Equadiff 9 CD ROM into the drive and switch to it.
2. Change to the directory **acroread**.

3. You will find several subdirectories for particular operating systems. Choose the appropriate one and change to it.

   (a) OS/2 users — read the file `aro2e30.txt` for more details, then run `aro2e30.exe` and follow the instructions.

   (b) Microsoft Windows users – run the file `ar16e301.exe` (Windows 3.1 and 3.11) or `ar32e301.exe` (Windows 95 and NT) and follow the instructions.

   (c) Unix users — choose the file for your unix-type system and copy it to the hard disk. Then unpack it using gunzip and tar programs and follow the instructions in `INSTGUID.TXT` file. The file system of this CD ROM is ISO 9660 with Rock Ridge Extensions so you should see long filenames.

   (d) Mac OS users — copy the file `!ar3_mac.sit` to the hard disk and unpack it using Stuffit program. Then read the file `ReadMe-Reader` for more details, run `Reader 3.01 Installer` and follow the instructions.

About Acrobat Reader and PDF

Acrobat Reader enables you to view PDF files easily. This format allows hyperlinks to other parts of the document, to other files, and even to files placed somewhere on the Internet. If you click on such a link, you will jump to another place of the same or another file.

Links in the documents of the Equadiff 9 CD ROM are denoted with four colours. If you move the cursor (which is normally a small hand with all fingers stretched) to such a word, the cursor will change (to a small hand with thumb and forefinger stretched). Then you can click. There are the following types of links:

- Red — references to equations, theorems, hypotheses, sections etc.
- Green — bibliographical citations.
- Blue — links to other files.
- Cyan — links to home pages (www browser must be configured).

(Of course the four previous color words are not the real links.)

Every PDF document can be displayed in Acrobat Reader in three forms:

- Page — only the pages are displayed.
- Page + Bookmarks — in the strip on the left hand side, bookmarks are displayed. If you click on some, you will jump to the corresponding place

in the file. In front of some bookmarks, there is an arrow (looking like a triangle). If it is turned right and you click on the arrow, the bookmark "opens" and further subordinate bookmarks appear.

- Page + Thumbnails — in the strip on the left hand side, thumbnails (miniature views of pages) are displayed. If you click on some, you will jump to the corresponding page.

In addition, the document can be displayed either in a window with pull-down menus, toolbar etc. (in any of the three previously mentioned forms) or in a full screen.

To navigate pages, you can use pull-down menus at the top of the window, keyboard shortcuts, bookmarks, thumbnails, horizontal and vertical scroll bars, or the toolbar (you click on buttons). The last way we describe is in fact the easiest. For better knowledge of Acrobat Reader we recommend to study *Reader Online Guide* in *Help* pull-down menu.

The Toolbar is shown in the next picture.

The meaning of the buttons are as follows (the text in parentheses describes what happens or what can be done if this option is selected):

1 — Page Only (see above).

2 — Bookmarks and Page (see above).

3 — Thumbnails and Page (see above).

4 — Hand (pressing left hand mouse button and holding it you can move the page around).

5 — Zoom In (clicking on the page doubles the current magnification, dragging the cursor with the left hand mouse button pressed draws a rectangle around the area which will be magnified).

6 — Select Text (using the left hand mouse button a text is selected that can be copied to the clipboard).

7 — First Page (jumps to the first page of the document).

8 — Previous Page (jumps to the previous page of the document).

9 — Next Page (jumps to the next page of the document).

10 — Last Page (jumps to the last page of the document).

11 — Go Back (retracing the viewing path — returns one step in the history of browsing).

12 — Go Forward (retracing the viewing path — returns in the reverse direction one step in the history of browsing).

13 — Actual Size (the page is displayed in the actual size).

14 — Fit Page (scales the page to fit within the main window).

15 — Fit Width (scales the page to fit the width of the main window).

16 — Find (finds words in the document).

17 — Weblink (launches www browser — only available if Acrobat Reader was configured for it — see below).

If your computer has an access to the Internet, we recommend that you configure Acrobat Reader. In the pull-down menu choose *File*, then *Preferences*, and then *Weblink...* Fill in your favorite www browser. You can check the option *Show Toolbar Button* too, so that the button 17 (Weblink) appeared in the toolbar. Now, if you click on the link corresponding, e.g., to a home page somewhere on the Internet, the www browser is started and the corresponding page is displayed.

Viewing Equadiff 9 materials

Insert Equadiff 9 CD ROM into the drive and run Acrobat Reader. In the pull-down menu choose *File* and then *Open*. Switch to the CD ROM and change the directory **equadiff**. Select the file `equadiff.pdf` and then click on the *Open* button. The first page of the main file will be displayed. You can browse through it using the toolbar buttons as described in the previous section.

If your CD ROM drive is slow, you can copy the contents of the directory **equadiff** to the harddisk. The only condition is that all the files must be in the same directory. You can do that also in case your computer does not have a CD ROM drive, but works in a network, where another computer has one.

If you click on a link corresponding to another file, this file is displayed. To be able to return easily to the main file, go to the first page (using the button 7 in the toolbar). Somewhere near the bottom of the first page, you will find the button RETURN. Clicking on it returns you to the main file. The same is true for photographs.

If you click on a link corresponding to another place in the same file (equation reference, bibliography citation etc.) and then you want to return to the place from where you jumped, use the button 11 in the toolbar (Go Back).

Photographs on this CD ROM

The photographs from the Equadiff 9 Conference are in two formats — PDF and TIFF. While the former are placed in the directory **equadiff** and are accessible from the main file `equadiff.pdf`, thus using Acrobat Reader, the latter are placed in the directory **photos**. To view these high quality photographs you need a program that can display compressed TIFF format (Adobe Photoshop, Photo Styler, Corel Draw, PMView92, GIMP and many others). The numbering of the TIFF files corresponds to the order in which the photographs are used in the section Equadiff 9 Conference in pictures. Keep in mind that these files are rather big (about 4–7 MB). If you have such a program, you can enjoy nice rememberances of the last week of August 1997 in Brno.

About the preparation of this CD ROM

All the Conference materials and contributions were converted into LaTeX 2_ε. Lots of special packages were used (e.g. llncs, equadiff, amsmath, amsfonts, graphicx, hyperref). The photographs were scanned with the resolution 300 DPI and arranged with Adobe Photoshop. Then DVI files were processed by dvips. Finally, PostScript files were distilled using Adobe Acrobat Distiller to obtain PDF files.

Equadiff 9 publications

The following Conference publications can be found on this CD ROM:

- **Program** (69 pp.)
- **Abstracts and Enlarged Abstracts** (239 pp.)
- **Equadiff 9 Participants — final version** (2 pp.)
- **Directory of Participants** (14 pp.)
- **List of Countries** (1 p.)
- **Proceedings** (260 pp.)
- **Archivum mathematicum — Equadiff 9 issue** (236 pp.)
- **Papers** (338 pp.)