

EDITORIAL

FCAA RELATED NEWS, EVENTS AND BOOKS (FCAA–VOLUME 16–2–2013)

Virginia Kiryakova

Dear readers,

in the Editorial Notes we announce some important news for our journal, information on international meetings, events, new books, etc. related to the FCAA (Fractional Calculus and Applied Analysis) areas.

**This is a Special Issue with Papers Dedicated
to the 70th Anniversary of Professor Francesco Mainardi**

Guest-Editors:

Rudolf Gorenflo, Yury Luchko, Virginia Kiryakova

1. Indexing of the FCAA Journal

As earlier announced, since 2011 the journal “Fractional Calculus and Applied Analysis” is indexed in *Scopus*, and in *Science Citation Index Expanded* (SCIE) and *will receive its first Impact Factor for the year 2013*.

Besides, FCAA contents has been regularly indexed, since its very first issue (Volume 1 – Issue 1 – 1998) on *MathSciNet*, referred in *Math. Reviews* and *ZBL für Mathematics*, included in a series of World bibliographic databases (as: *AMS Digital Math. Registry*; *British Library Direct*; *Electronic Journals Library - University Library of Regensburg*; *OATAO (Open Archive Toulouse Archive Ouverte)*, *Google Scholar*, etc.).

A search on March 3, 2013 by *Harzing’s “Publish or Perish”* software is providing the following data for the Journal impact:

Fractional Calculus and Applied Analysis: all

Query date: 2013-03-03; Papers: 269; Citations: 2494; Years: 16;

Cites/year: 155.88; Cites/paper: 9.27/2.0/0 (mean/median/mode);

Cites/author: 1473.98; Papers/author: 168.95;

Authors/paper: 1.98/2.0/1 (mean/median/mode)

h-index: 23; g-index: 44; e-index: 32.54;

hc-index: 16; hI-index: 11.76; hI,norm: 19; hm-index: 18.92;

AW-index: 16.81; AWCR: 282.65; AWCRpA: 170.28;

Hirsch a=4.71; m=1.44; Contemporary ac=4.42

97 paper(s) with 1 author(s); 95 paper(s) with 2 author(s); 63 paper(s) with 3 author(s); 13 paper(s) with 4 author(s); 1 paper(s) with 5 author(s).

2. Report on FDA'13, the 6th IFAC Workshop

Dear colleagues,

the FDA'13 workshop was held February 4-6, 2013 in Grenoble, France. This was a nice place for interesting comments and discussions on the topics of Fractional Differentiation and Applications as no parallel sessions were organized. This workshop was held in frames of the SSSC joint conferences of IFAC. Its details can be found at <http://www.gipsa-lab.fr/SSSC2013/>, including the final program.

To extend a bit this event, I have placed the workshop proceedings at <http://dl.free.fr/jfuIEr41l>. Note that these proceedings are now available for free on the IFAC papers online website (as for any IFAC event), at <http://www.ifac-papersonline.net/>.

With best regards, FDA Publication Co-Chair: *Jocelyn Sabatier*

3. Forthcoming Meetings Related to FCAA Topics

6th Symposium on Fractional Derivatives and Their Applications (FDTA11) August 4-7, 2013, Portland – OR, USA

Details were announced in the previous FCAA issue, and can be found at <http://www.asmeconferences.org/IDETC2013/>. Please click the link on “25th Conference on Vibration and Noise” and you will see this symposium listed VIB-12.

The authors of conference submissions above will be invited to expand and improve their manuscripts for inclusion in a special issue of the “*ASME Journal of Vibration and Acoustics*”, Guest-edited by the organizers of this symposium. See details at <http://www.asmedl.org/VibrationAcoustics>, and choose the link Submit Papers. Next, select the Journal of Vibration and Acoustics and then choose the *Special Issue option for “Fractional Calculus in Vibration and Acoustics”*. Deadline for manuscript submissions: April 30, 2013. The target date for all articles to be accepted is August 30, 2013 and the target publication date is December 2013 or early 2014.

Note, participation in the conference is not mandatory for submission of a manuscript for the special issue of the journal. However, we hope you will consider submitting to both.

Contributed by *Thomas J. Royston* (University of Illinois at Chicago), on behalf of the Symposium and Special Issue organizers/co-editors: Dieter Klatt, Richard L. Magin, Francesco Mainardi, Thomas J. Royston.

International Conference
“Complex Analysis and Applications’ 2013”
October 30 – November 2, 2013, Sofia, Bulgaria
<http://www.math.bas.bg/complan/caa13>

This conference is one of the events by which the Institute of Mathematics and Informatics - Bulgarian Academy of Sciences marks

the *100th Anniversary of Academician Ljubomir Iliev* (1913-2000), a long-term Director of the Institute. The main Organizer is the Section “Analysis, Geometry and Topology” (former “Complex Analysis”), with a 50 Years long history, whose founder and head Acad. L. Iliev was. The name of the conference is to commemorate the specialized international conferences “Complex Analysis and Applications” (Varna 1981, 1983, 1985, 1987, 1991) organized under Acad. Iliev’s guidance.

It is also a continuation of the recent series of specialized international conferences “*Transform Methods and Special Functions*” in Bulgaria (1994, 1996, 1999, 2003, 2011), <http://www.math.bas.bg/~tmsf>.

Planned Sections: – Functions of One Complex Variable; – Several Complex Variables and Complex Geometry; – *Special Functions and Integral Transforms*; – *Fractional and Operational Calculi*; – Real and Functional Analysis; – Geometry and Topology; – Methodology of Science and Education; - *Varia in Analysis, Differential Equations, Applications.*

Details on the deadlines, registration fees, accommodation in nearby hotels, scientific program, etc. will be available and updated at the conference website, <http://www.math.bas.bg/complan/caa13>.

If you are interested to receive the official announcements and details on “CAA’ 2013”, please send an e-mail to: caa13@math.bas.bg, indicating your names, affiliation, actual e-mail address for contacts.

On behalf of the Organizers,

Chair of the International Program Committee: *Virginia Kiryakova*

4. Finding Mathematical Formulas, Wolfram Research Inc.

Wolfram Research Inc. provides a large array of resources for scientists, teachers, students, working with, or being interested or work with in mathematical formulas. In this short note we list some of them.

1) *WolframAlpha*, <http://www.wolframalpha.com> delivers formulas, graphics, computations, and more. This site allows to

ask for formulas in natural language, for example, the query “fractional derivative of log” will return you about 10 formulas.

2) *The Wolfram Functions Site*, <http://functions.wolfram.com> allows to see and download in various formats 300,000+ formulas and 10,000+ graphics, for example, <http://functions.wolfram.com/GeneralIdentities/9/> returns tens of generic formulas for symbolical and fractional differentiation.

3) A lot of formulas can be delivered, of course, by *Mathematica*, for example, it can be found the hidden law in the following incomplete number sequence:

$$\text{FindSequenceFunction}[\{1, 6, 45, 420, 4725, 62370, 945945\}, n]$$

$$2^{-1+n} n \text{Pochhammer}\left[\frac{3}{2}, -1 + n\right].$$

4) The site <http://mathworld.wolfram.com> by Eric Weisstein allows not only to find formulas but also provides a lot of background information connected with them.

5) The largest collection of the formulas (35,000+) for 500+ univariate probability distributions, which includes 2,500+ generic formulas for 60 characteristics, can be loaded from the blog [http://blog.wolfram.com/2013/02/01/the-ultimate-univariate-probability-distribution-explorer,](http://blog.wolfram.com/2013/02/01/the-ultimate-univariate-probability-distribution-explorer/) or shorter, <http://tinyurl.com/ag82vow> (search for “you can download the Univariate Probability Explorer here”).

6) The Wolfram Demonstrations project – a collection of 8,000 interactive demonstrations for a wide variety of mathematical and scientific topics. Search for formulas, at [http://demonstrations.wolfram.com/search.html?query=formulas,](http://demonstrations.wolfram.com/search.html?query=formulas) to see engaging formula visualizations.

We encourage the reader to check out the listed resources and to contribute their own formulas.

Of course, users can look at Wikipedia, <http://www.wikipedia.org/>, for numerous books and articles, where many additional formulas can be found. But formulas, presented through system *Mathematica* can be copied/pasted, additionally verified and easily used our system. They also can be converted from *Mathematica* to *LaTeX* and MathML.

Contributed by: *Oleg Marichev, Michael Trott*

5. New Books

Changpin Li, Yujiang Wu, Ruisong Ye (Editors), *Recent Advances in Applied Nonlinear Dynamics with Numerical Analysis* (Fractional Dynamics, Network Dynamics, Classical Dynamics and Fractal Dynamics with Their Numerical Simulations). Ser. Interdisciplinary Mathematical Sciences: Volume **15**, World Scientific Publishing Co. & Imperial College Press, March 2013, 416 pp., ISBN: 978-981-4436-45-8. Details at:

<http://www.worldscientific.com/worldscibooks/10.1142/8637>

Nonlinear dynamics is still a hot and challenging topic. In this edited book, we focus on fractional dynamics, infinite dimensional dynamics defined by the partial differential equation, network dynamics, fractal dynamics, and their numerical analysis and simulation.

Fractional dynamics is a new topic in the research field of nonlinear dynamics which has attracted increasing interest due to its potential applications in the real world, such as modeling memory processes and materials. In this part, basic theory for fractional differential equations and numerical simulations for these equations will be introduced and discussed.

In the infinite dimensional dynamics part, we emphasize on numerical calculation and theoretical analysis, including constructing various numerical methods and computing the corresponding limit sets, etc.

In the last part, we show interest in network dynamics and fractal dynamics together with numerical simulations as well as their applications.

Readership: Senior undergraduates, postgraduates and experts in nonlinear dynamics with numerical analysis.

Agnieszka B. Malinowska and Delfim F. M. Torres, *Introduction to the Fractional Calculus of Variations*, Imperial College Press, London & World Scientific Publishing, Singapore, Dec. 2012, 292 pp., ISBN-10: 1-84816-966-3; ISBN-13: 978-1-84816-966-1. Details at:

<http://www.worldscientific.com/worldscibooks/10.1142/p871>

Contents: – The Classical Calculus of Variations; – Fractional Calculus of Variations via RiemannLiouville Operators; – Fractional Calculus of Variations via Caputo Operators; – Other Approaches to the Fractional Calculus of Variations; – Towards a Combined Fractional Mechanics and Quantization.

This invaluable book provides a broad introduction to the fascinating and beautiful subject of Fractional Calculus of Variations (FCV). In 1996, FVC evolved in order to better describe non-conservative systems in mechanics. The inclusion of non-conservatism is extremely important from

the point of view of applications. Forces that do not store energy are always present in real systems. They remove energy from the systems and, as a consequence, Noether's conservation laws cease to be valid. However, it is still possible to obtain the validity of Noether's principle using FCV. The new theory provides a more realistic approach to physics, allowing us to consider non-conservative systems in a natural way. The authors prove the necessary EulerLagrange conditions and corresponding Noether theorems for several types of fractional variational problems, with and without constraints, using Lagrangian and Hamiltonian formalisms. Sufficient optimality conditions are also obtained under convexity, and Leitmann's direct method is discussed within the framework of FCV.

The book is self-contained and unified in presentation. It may be used as an advanced textbook by graduate students and ambitious undergraduates in mathematics and mechanics. It provides an opportunity for an introduction to FCV for experienced researchers. The explanations in the book are detailed, in order to capture the interest of the curious reader, and the book provides the necessary background material required to go further into the subject and explore the rich research literature.

Readership: Advanced undergraduate, graduate students, researchers in mathematics, physics, operations research and applied sciences.

6. Prof. Francesco Mainardi's 70th Anniversary

Francesco Mainardi, Free Professor of Mathematical Physics – Department of Physics, University of Bologna, and INFN – Italy, born at Lugo (Ravenna), Italy, on 29 Dec. 1942, is a *Member of Editorial Board* of the “FCAA” Journal since its beginning.

Research Interests: asymptotic methods in applied mathematics, special functions and fractional calculus, continuum mechanics (solids and fluids) with special regard to linear viscoelasticity, mathematical aspects of wave propagation and diffusion, stochastic models in statistical physics.

Scientific Publications: He is author of approx. 150 papers on Applied Mathematics, Continuum Mechanics, Wave Motion, Diffusion, Special Functions, Fractional Calculus, Stochastic Processes, published in international refereed journals and books.

List of Publications, at

http://www.fracalmo.org/mainardi/maina_pub_last.htm.

The impact of his publications, with great number of citations, can be seen in his

Google Scholar Profile, at <http://>

scholar.google.com/citations?user=UYxWyEEAAA&hl=en&oi=ao;
<http://scholar.google.com/scholar?hl=en&lr=&q=f+mainardi>.

Books:

1. He is the Author of the book “*Fractional Calculus and Waves in Linear Viscoelasticity*”, Imperial College Press, London (2010), pp. 340, ISBN 978-1-84816-329-4; see: <http://www.icpress.co.uk/mathematics/p614.html>

2. He is Co-author (with S. Rogosin) of the book “*The Legacy of A.Ya. Khintchine’s Work in Probability Theory*”, Cambridge Scientific Publ. Cambridge, (2011), pp 280. ISBN 978-1-904868-64-4; see <http://www.cambridgescientificpublishers.com/>

3. He is the Editor of the book “*Wave Propagation in Viscoelastic Media*”, Pitman, London (1982), Ser. of “Pitman Research Notes in Mathematics” No 52, which contains selected lectures held at the Euromech 127.

4. He is the Co-Editor (with A. Carpinteri) of the book “*Fractals and Fractional Calculus in Continuum Mechanics*”, Springer-Verlag, Wien (1997), Ser. of “CISM Courses and Lectures” No 378. This book contains selected lectures held at the CISM Course including two survey lessons by him.

5. He is Co-Editor (with A Guran, A. De Hoop, D. Guicking) of the book “*Acoustic Interactions with Submerged Elastic Structures: Part III: Acoustic Propagation and Scattering, Wavelets and Time Frequency Analysis*” . This book acts as Professor Herbert Uberall Festschrift Volume, with a foreword by Hans A. Bethe), World Scientific, Singapore (2001), pp. 422, ISBN 981-02-2950-X.

Visiting Professor, Abroad (periods of stay for scientific collaboration): UK, Germany, Holland, USA, Canada, India, Australia, Brasil, South Africa, etc.

Promotion of Fractional Calculus: Besides his role as Editor in “FCAA” journal, in “Chaos, Solitons and Fractals” and acting as referee for several other journals related to FC, at the end of 2000, Prof. Mainardi has created (with some collaborators) the specialized Website *FRActional CALculus MOdelling*, <http://www.fracalmo.org>.

He has been several times *Member of the Committees of International Workshops related to FC*, as:

- The 1st IFAC Workshop on Fractional Differentiation and its Applications, “FDA’04” took place in Bordeaux, France; July 19-21, 2004; <http://extranet.ims-bordeaux.fr/LAPS/wlap/events/FDA04/home.html>

- The 2nd IFAC Workshop on Fractional Differentiation and its Applications “FDA’06” took place in Porto, Portugal; July 19-21, 2006; <http://www.gecad.isep.ipp.pt/FDA06/>

- The 3rd IFAC Workshop on Fractional Differentiation and its Applications “FDA’08” took place in Ankara, Turkey; November 5-7, 2008; <http://fda08.cankaya.edu.tr/>

- The 4th IFAC Workshop on Fractional Differentiation and its Applications “FDA’10” took place at the University of Extremadura, Badajoz, Spain, October 18-20, 2010; <http://web.tuke.sk/fda10/index.html>

- The 5th Symposium on Fractional Differentiation and its Applications “FDA’12” took place at the Hohai University, Nanjing, China, 14-17 May 2012; <http://em.hhu.edu.cn/fda12>

- Chair of Steering Committees for the international events “FDA’12” and next coming “FDA’16” (in Italy); <http://www.icfda14.dieei.unict.it>

Organization of Conferences and Advanced Schools: To promote the research in fields of wave propagation he has organized, as a Chairman, 3 European Mechanics Colloquia:

1. Euromech 127 on Wave Propagation in Viscoelastic Media, held in Taormina on April 14-18, 1980 (co-chairman G. Pallotti),

2. Euromech 179 on Waves in Fluid Filled Tubes, held in Rimini on June 18-22, 1984 (co-chairman H. Buggisch),

3. Euromech 240 on Dispersive Waves in Dissipative Fluids, held in Bologna in 1988, August 30 - September 2 (co-chairman D.G. Crighton). He has coordinated (with A. Carpinteri)

4. Advanced School: Scaling Laws and Fractality in Continuum Mechanics (A survey of the methods based on Renormalization Group and Fractional Calculus) held at CISM (Centre International des Sciences Mécaniques), Udine (Italy), from 23 to 27 September 1996 providing lecture notes based on his lessons.

Invited Mini-Courses for PhD and Post-Doc students:

1. Mini-course (with R. Gorenflo) on Fractional Calculus at MaPhySto (Mathematical Physics and Stochastics) Center, at Mathematical Department, University of Aarhus (Denmark) on January 2000.

2. Mini-course on Fractional Calculus at the international School SERC (Science and Engineering Research Council), Centre for Mathematical Sciences, in Pala Campus, Kerala, India on May 3-7, 2010.

3. Mini-course on Fractional Calculus at the Dept of Applied Mathematics, University of Campinas, Brasil, 6-17 September 2010.

4. Mini-course on Fractional Calculus at the international School SERC (Science and Engineering Research Council), Centre for Mathematical Sciences, in Pala Campus, Kerala, India on May 1-4, 2012.

5. Mini-course on Fractional Calculus at the International XXXVII School on Mathematical Physics in Ravello (Italy), September 17-22, 2012.