EDITORIAL

FCAA RELATED NEWS, EVENTS AND BOOKS (FCAA–VOLUME 23–1–2020)

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Dear readers,

in the Editorial Notes we announce news for our journal, anniversaries, information on international meetings, events, new books, etc. related to the *FCAA* ("Fractional Calculus and Applied Analysis") areas. All these Notes are published online with free open access.

1. Reports on Some FC Related Meetings in 2019

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"Fractional Order Control from Practical Point of View"
- A EU COST (EU COST Action #CA15225) Workshop
(5 November 2019, Delft University of Technology)
Website: https://www.tudelft.nl/index.php?id=56763

A day workshop on "Fractional Order Control from Practical Point of View" was organized and hosted by Dr. Hassan HosseinNia held on Nov 5th, 2019 at Delft University of Technology, Delft, The Netherlands. This workshop promoted the utilization of fractional order control under **EU COST action #CA15225**. Frequency domain analysis is a key for industry to understand and design controllers. In this event, the frequency domain analysis tools to design fractional order controllers was presented and discussed. Lectures were given by:

- Dr. Duarte Valerio, Universidade de Lisboa -– Instituto Superior Técnico, Portugal: "Basics and fundamental of fractional calculus"
- Dr. Niranjan Saikumar, Delft University of Technology, The Netherland: "Fractional-order precision motion control for mechatronic applications"
- Dr. Fabrizio Padula, Curtin University, Australia: "Robust fractional PID control"
- Dr. Patrick Lanusse, Université de Bordeaux (CRONE team), France: "CRONE control methodology for SISO and/or MIMO and/or preview system"

They also gave some practical examples, which advantageously implemented fractional order control successfully. Next to approved speakers, a group of Ph.D. candidates on control, and researchers on control domain, and professionals interested in application of fractional calculus with the goal to show the advantage to industry, took part.

One can find the lectures online:
https://www.tudelft.nl/index.php?id=56763.

This event was well attended and the attendees are posed for a group photo after the workshop as seen below.
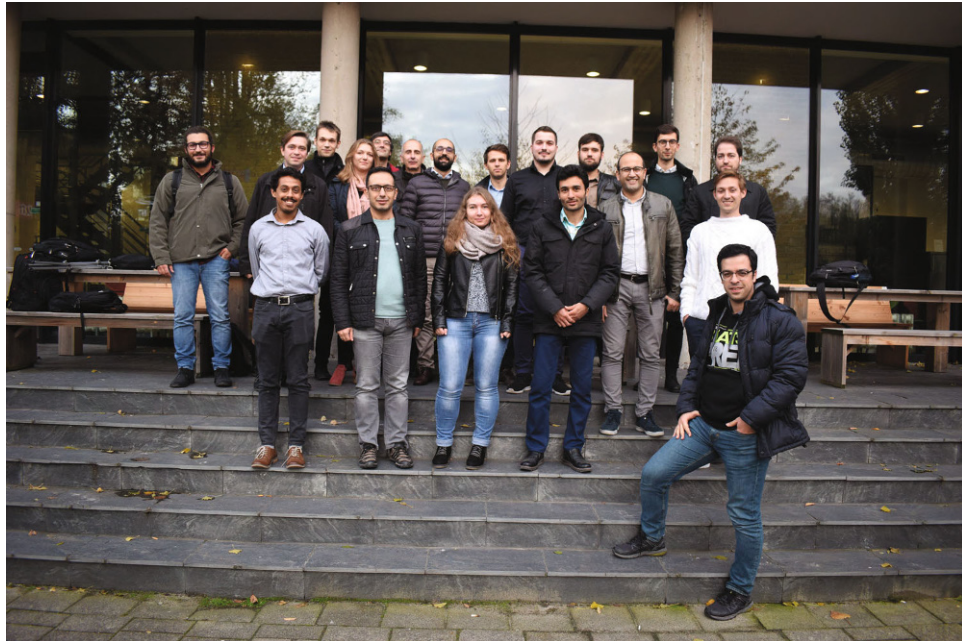
Prepared by *Dr. Hassan HosseinNia*

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"FMSE 19" Workshop
Fractional Models in Science and Engineering
Dept. of Mathematics and Statistics, KFUPM:
King Fahd University of Petroleum and Minerals
(16 December 2019, S. Arabia)
Website: https://fmse.kfupm.edu.sa/

Objectives of FMSE Workshops:

– To bring together from different disciplines those who are interested in theoretical, numerical, and applied aspects of fractional models.

– To provide a platform for face-to-face exchange of ideas, sharing experience, and promotion of fractional calculus as a valuable tool.

– To raise awareness of fractional models among junior researchers and graduate students.

FMSE 19: https://fmse.kfupm.edu.sa/fmse19/index.html
Coordinator: Khaled Furati

Workshop Speakers:

– Ali Dogru: "Computational Modeling of Large Scale Oil & Gas Reservoirs"

– ShuYu Sun: "Mathematical modeling and analysis of fractional partial differential equations for flow in fractured porous media"

– YangQuan Chen: "Optimal stochasticity entails fractional calculus that enlightens big data and machine learning research"

– Hongwei Liu: "Recovery of the fractional diffusion equation from a single boundary measurement"

– Huangxin Chen: "Mixed finite element methods for fractional partial differential equations for flow and transport in fractured porous media"

– Abdul Khaliq: "Distributed Order Space Fractional Reaction-Diffusion Equation with Time Dependent Boundary Conditions"

Download Talks:
https://fmse.kfupm.edu.sa/fmse19/talksdownload.html.

Reported by: *YangQuan Chen*

2. **Calendar of Coming FC Related Meetings in 2020**
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For other FC related events, please check at Ed. Note of FCAA, Vol. 22, No 5 (2019), at: https://www.degruyter.com/view/j/fca.2019.22.issue-5/ fca-2019-0061/fca-2019-0061.xml?format=INT.

Reminders for:

– **NSFDE&A'20**: International Workshop "**Numerical Solution of Fractional Differential Equations and Applications**", June 8-13, 2020, **Sozopol, Bulgaria** (Black Sea)

1st Announce at:
http://parallel.bas.bg/Conferences/NSFDE&A_2020-Sozopol.pdf.

Deadlines: – Registration / Intention to participate: Jan. 31, 2020; – Submission of abstracts: Feb. 15, 2020; – Notification of acceptance: March 1, 2020. Contacts and queries: nsfdea20@parallel.bas.bg

– **AMEE 2020**: 46th International Conference "**Applications of Mathematics in Engineering and Economic**s", June 7-13, 2020, **Sozopol, Bulgaria** (Black Sea)

Website: http://amee.tu-sofia.bg/

Special session: "Fractional Calculus, Special Functions and Applications" (organized by Virginia Kiryakova, Jordanka Paneva-Konovska).

Contacts: amee@tu-sofia.bg (conference secretary), virginia@diogenes.bg (for the special session)

Both AMEE 2020 and NSFDE&A'20 will be held same time and place - Sozopol (ancient Apolonia), a picturesque Bulgarian town on the Black Sea coast, 33 km to the south from Bourgas. The Bourgas International Airport is less than 50 km to the north from Sozopol. Alternatively, reach Sofia Airport, then travel by bus Sofia-Sozopol.

– International Conference on "**Mathematical Analysis and Applications in Science and Engineering**", July 20-24, 2020, ISEP, **Porto, Portugal**

Website: https://www.isep.ipp.pt/Page/ViewPage/ICMASC

New announces for:

"OTHA-2020"
Modern Methods, Problems and Applications of Operator Theory and Harmonic Analysis, X
(2 April-01 May 2020, Rostov-na-Don, Russia)
Website: http://otha.sfedu.ru/,
http://www.otha.sfedu.ru/conf2020/

Dear colleagues, on behalf of Program and Organizing Committees, let me remind you about the forthcoming international conference OTHA, its 10th edition. Working days: 27-30 April 2020, arrival: 26.04.20, departure: 01.05.20. Deadline for registration and abstract submission: 1 April 2020.

Updated list of conference sessions: – Functional analysis and operator theory; – Function theory and approximation theory; – Differential equations and mathematical physics; – Hausdorff operators and related topics; – Probability-analytical models and methods; – Complex and hypercomplex analysis; – Geometric function theory and related topics; – Bioinformatics and mathematical modelling.

For details and announcements, visit the website.
Contacts and queries: otha.conference@gmail.com

Yours,
Alexey N. Karapetyants

ISAAC Newton Institute (INI) for Mathematical Sciences

Workshop "Fractional Differential Equations"
(4 January 2021 to 30 April 2021, Cambridge, UK)
Website: https://www.newton.ac.uk/event/fde,
https://www.newton.ac.uk/

Participation in INI programmes is by invitation only. Anyone wishing to apply to participate n the associated workshop(s) should use the relevant workshop application form.

Organisers: – Vassili Kolokoltsov (University of Warwick), – Jozsef Lörinczi (Loughborough University), – Eulalia Nualart (Universitat Pompeu Fabra), – Michael Roeckner (Universität Bielefeld), – Laura Sacerdote (University of Torino).

Programme Theme: see at https://www.newton.ac.uk/event/fde.

Expected workshops, https://www.newton.ac.uk/event/fde/workshops:

– FDEWO1: Deterministic and stochastic fractional differential equations and jump processes (22.02.2021-26.02.2021)

– FDEWO2: Fractional kinetics, hydrodynamic limits and fractals (22.03.2021-26.03.2021)

– FDEWO3: Optimal control in fractional dynamics (05.04.2021-09.04.2021)

More details at this event are expected in April 2020.

Reported by:
Jozsef Lorinczi, J.Lorinczi@lboro.ac.uk

3. New Books

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Trifce Sandev, Zivorad Tomovski, *Fractional Equations and Models*. Springer Nature; 1st Ed. 2019, 345 pp., xviii, 60 illustr., ISBN 978-3-030-29613-1 (print), ISBN 978-3-030-29614-8 (eBook); https://doi.org/10.1007/978-3-030-29614-8.

Product Flyer: https://www.springer.com/gp/product-marketing-tool/flyer/9783030296131

Description: Fractional equations and models play an essential part in the description of anomalous dynamics in complex systems. Recent developments in the modeling of various physical, chemical and biological systems have clearly shown that fractional calculus is not just an exotic mathematical theory, as it might have once seemed. The present book

seeks to demonstrate this using various examples of equations and models with fractional and generalized operators. Intended for students and researchers in mathematics, physics, chemistry, biology and engineering, it systematically offers a wealth of useful tools for fractional calculus.

Keywords: Fractional Calculus; Mittag-Leffler functions; Anomalous diffusion; Stochastic processes; Kinetic equations.

Contents:
 – Front Matter
 – Introduction: Mittag-Leffler and Other Related Functions
 – Generalized Differential and Integral Operators
 – Cauchy Type Problems
 – Fractional Diffusion and Fokker-Planck Equations
 – Fractional Wave Equations
 – Generalized Langevin Equation
 – Fractional Generalized Langevin Equation
 – Back Matter

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Swerre Holm, *Waves with Power-Law Attenuation*. Springer Nature, 2019, 312 + xxxvii pp., ISBN 978-3-030-14926-0 (Print), ISBN 978-3-030-14927-7 (Online);
https://link.springer.com/book/10.1007%2F978-3-030-14927-7 .

Description: This book integrates concepts from physical acoustics with those from linear viscoelasticity and fractional linear viscoelasticity. Compressional waves and shear waves in applications such as medical ultrasound, elastography, and sediment acoustics often follow power law attenuation and dispersion laws that cannot be described with classical viscous and relaxation models. This is accompanied by temporal power laws rather than the temporal exponential responses of classical models.

The book starts by reformulating the classical models of acoustics in terms of standard models from linear elasticity. Then, non-classical loss models that follow power laws and which are expressed via convolution models and fractional derivatives are covered in depth. In addition, parallels are drawn to electromagnetic waves in complex dielectric media. The book also contains historical vignettes and important side notes about the validity of central questions. While addressed primarily to physicists and engineers working in the field of acoustics, this expert monograph will also be of interest to mathematicians, mathematical physicists, and geophysicists.

Couples fractional derivatives and power laws and gives their multiple relaxation process interpretation Investigates causes of power law attenuation and dispersion such as interaction with hierarchical models of polymer chains and non-Newtonian viscosity Shows how fractional and multiple relaxation models are inherent in the grain shearing and extended Biot descriptions of sediment acoustics Contains historical vignettes and side notes about the formulation of some of the concepts discussed.

Keywords: Power laws acoustics; Linear viscoelasticity; Elastic waves acoustics; Ultrasound mathematical basis; Fractional linear viscoelasticity; Wave propagation and attenuation; Wave equations.

Contents:
Acoustics and Linear Viscoelasticity
    – Front Matter
    – Classical Wave Equations
    – Models of Linear Viscoelasticity
    – Absorption Mechanisms and Physical Constraints
Modeling of Power-Law Media
    – Front Matter
    – Power-Law Wave Equations from Constitutive Equations
    – Phenomenological Power-Law Wave Equations
    – Justification for Power Laws and Fractional Models
    – Power Laws and Porous Media
    – Power Laws and Fractal Scattering Media
    – Back Matter

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Manuel Duarte Ortigueira, Duarte Valério, *Fractional Signals and Systems*, De Gruyter, Feb. 2020, 281 pp., xvii, 50 Fig., 30 Tables; ISBN 978-3-11-062129-7 (Print), ISBN: 978-3-11-062458-8 (eBook); https://www.degruyter.com/view/product/510523?lang=en

Print Flyer: https://www.degruyter.com/view/product/510523?lang=en

Description: The book presents the theory and applications of fractional derivatives in signals and systems. Both time and frequency analysis are presented. Of interest to mathematicians and physicists as well as to engineers.

The book illustrates the theoretical results of fractional derivatives via applications in signals and systems, covering continuous and discrete derivatives, and the corresponding linear systems. Both time and frequency analysis are presented. Some advanced topics are included like derivatives of stochastic processes. It is an essential reference for researchers in mathematics, physics, and engineering.

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Jórsef Lörinczi, Fumio Hiroshima, Volker Betz, *Feynman-Kac-Type Formulae and Gibbs Measures. Volume 1*, De Gruyter, Jan. 2020, 2nd rev. ed., 563 pp., xii, 50 Fig., 30 Tables; ISBN 978-3-11-033004-5 (Print), ISBN: 978-3-11-033039-7 (eBook);
https://www.degruyter.com/view/product/209774

Print Flyer: https://www.degruyter.com/flyer/DEG/product/209774.pdf

Description: This is the second updated and extended edition of the successful book on Feynman-Kac theory. It offers a state-of-the-art mathematical account of functional integration methods in the context of self-adjoint operators and semigroups using the concepts and tools of modern stochastic analysis. The first volume concentrates on Feynman-Kac-type formulae and Gibbs measures.

The book addresses both beginners and experts, emphasis on the interdisciplinary character of the subject.

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