IPNet Digest Volume 27, Number 06 May 27, 2020 Today's Editor: Patricia (Patti) K. Lamm, Michigan State University Today's Topics: Postponement: Workshop on Optimization & Inverse Problems in Electromagnetism (OIPE2020) New Book: Modelling with ODEs, including Inverse Problems with ODEs PhD Positions: Applied Mathematics & Stochastics, including Inverse Problems PhD Studentship: Inverse Problems for Phase Contrast X-Ray CT PhD and Postdoc Positions: Applied Analysis, including Inverse Problems Table of Contents: Inverse Problems Table of Contents: Inverse Problems in Science and Engineering Submissions for IPNet Digest: Mail to ipnet-digest@math.msu.edu Information about IPNet: http://ipnet.math.msu.edu From: OIPE2020 <oipe2020@zut.edu.pl> Date: Thursday, May 7, 2020 Subject: OIPE2020 Conference Dear colleagues, Due to the epidemiological situation of COVID-19, the International Steering Committee decided that the conference will be postponed to 2021. Consultations are currently ongoing to determine a specific date. We apologize for any inconvenience, but we believe that 2021 will be much more appropriate and safe for all participants. We will inform you as soon as we set a new conference date. Please also follow our website. Jens Haueisen (chairman) Marcin Ziolkowski, 16th Workshop Chairman From: Alfio Borzi <alfio.borzi@mathematik.uni-wuerzburg.de> Date: May 12, 2020 Subject: New Book - Modelling with ODEs: A Comprehensive Approach Dear Colleagues, It is my pleasure to tell you about the new book : Modelling with Ordinary Differential Equations: A Comprehensive Approach by Alfio Borzi (Chapman and Hall/CRC Press, 2020 388 Pages - 57 B/W Illustrations ISBN 9780815392613)

This book should represent a new paradigm in the usual understanding and teaching of modelling with ordinary differential equations (ODEs). In fact, in addition to addressing different topics ranging from the general theory of ODEs, stability properties of solutions, limit cycles and synchronisation, and the fundamental topic of the calculus of variation, the book discusses the solution of inverse problems with ODEs that appear in the calibration of differential models. Furthermore, assuming that an adequate model of a given phenomenon is available, the book provides an introduction to optimal control tools that are required to design control mechanisms for the model to perform a given task. These tools are further extended to address problems of competition and cooperation that are modelled in the framework of differential games. The book is completed with a chapter on different stochastic processes and stochastic differential equations, and a final chapter on neural networks to solve ODE problems and related parameter identification problems.

As far as possible, the book aims to be self-contained, presenting a large variety of topics related to modelling with ODEs together and in a unified manner. For this purpose, many theoretical results are proved, many illustrative examples complement the text, and numerical methods are discussed to solve problems arising in the different chapters (a suite of codes is available online).

Please, for more details, see

https://urldefense.com/v3/__https://www.routledge.com/Modelling-with-Ordinary-Differential-Equations-A-Comprehensive-Approach/Borzi/p/book/9780815392613?utm_source= crcpress.com&utm_medium=referral__;!!HXCxUKc! iQwkSkD4FjE1NgxGhkIRlt368JDLD2Qrl4dR5P5H5cMaWT60xDzDM980g6nV8_mSR0vrRFc\$

With my best regards and many thanks

Alfio

Contents:

- 1. Introduction.
- 2. Elementary solution methods for simple ODEs.
- 3. Theory of ordinary differential equations.
- 4. Systems of ordinary differential equations.
- 5. Ordinary differential equations of order n.
- 6. Stability of ODE systems.
- 7. Boundary and eigenvalue problems.
- 8. Numerical solution of ODE problems.
- 9. ODEs and the calculus of variations.
- 10. Optimal control of ODE models.
- 11. Inverse problems with ODE models.
- 12. Differential games.
- 13. Stochastic differential equations.
- 14. Neural networks and ODE problems.

From: Gerlind Plonka-Hoch plonka@math.uni-goettingen.de [via NADIGEST]

Date: May 07, 2020 Subject: PhD Positions, Applied Mathematics and Stochastics

The Research Training Group RTG 2088 "Discovering Structure in Complex Data" at the Georg- August-University Goettingen offers two positions for Ph.D. candidates beginning a soon as possible. The salary is in accordance with the German public service salary scale (E13 TV-L) with 75 % for up to three years.

The research projects in this RTG focus on new mathematical concepts in statistics, optimization, and inverse problems. Detailed information for the PhD positions can be found at

https://urldefense.com/v3/__https://www.uni-goettingen.de/de/305402.html?cid=100683__;!!
HXCxUKc!hrYiWxaPRpUroLzEJFEnHsUpK5TuCqfcjbfwL1VEfy7R0phUjzFeCVsPiZbUhtFy\$

From: Simon Arridge <S.Arridge@cs.ucl.ac.uk> Date: Tuesday, May 12, 2020 Subject: PhD in Inverse Problems for Phase Contrast X-Ray CT at UCL

Project Description

A multidisciplinary consortium from UCL comprising the Advanced X-Ray Imaging group in the Department of Medical Physics and Biomedical Engineering, the Photonic Innovations Lab in the Department of Electronic and Electrical Engineering, and the Centre for Inverse Problems in Computer Science has received strategic funding from UKRI (Nikon-UCL Prosperity Partnership on Next-Generation X-Ray Imaging) to support a partnership tasked with developing disruptive approaches to the use of x-rays in science, industry, medicine and security.

Our prime industrial partner is Nikon X-Tek Systems and additional industrial partners include ISDI, Scintacor and Quantum Detectors. Other partners include the Swiss Federal Laboratories for Materials Science and Technology and three synchrotrons (Diamond, Elettra and the ESRF).

The Centre for Inverse Problems is leading the image reconstruction aspects of the consortium and we are looking a suitable PhD student to join our team. The student will develop innovative reconstruction algorithms involving phase retrieval, compressed sensing, deep learning, and large scale optimisation. The PhD project will involve detailed mathematical and computation development and will work closely with the experimental teams to ensure translation to real applications will be realised. Comprehensive training in the key elements of the research programme will be provided.

The partnership places a high priority in integrating all activities so appointed PhD candidates will be expected to work across multiple research groups, spend time both in academia and in industry, and participate in experiments at synchrotrons.

All studentships will be available for up to 4 years; candidates must have a UK first class or 2:1 honours degree, an MSc, or their international equivalent in physics, engineering, mathematics or a comparable subject. Studentships are available to UK and to all EU students regardless of whether they have resided in the UK in the previous 3

years.

Interested candidates should contact Prof Simon Arridge (s.arridge@ucl.ac.uk) to discuss the details of the project.

Details and application links at :

https://www.findaphd.com/phds/project/phd-position-in-image-reconstruction-for-nextgeneration-x-ray-tomography/?p121378

From: Giovanni S Alberti <giovanni.alberti@unige.it> Date: Saturday, May 23, 2020 Subject: PhD and Postdoc positions in Applied Analysis at the University of Genoa

It is a pleasure to announce the call for one PhD student and one Postdoc in Applied Analysis at the Department of Mathematics of the University of Genoa, Italy. The main research themes will be inverse problems, PDE, applied harmonic analysis and machine learning. Candidates who are familiar with one or more of these topics are encouraged to apply.

The start of the positions is planned in Autumn 2020, and the duration of the contracts is 3 years. At this stage, perspective candidates are only asked to complete an expression of interest (link for PhD and link for postdoc). For more details visit https://ml.unige.it/jobs-posts.html.

All the research activities will be carried out at the University of Genoa within MaLGa, a newly established machine learning center at the University of Genoa. The center carries out research in different aspects of machine learning, from theoretical to applied aspects. Today the center counts 10 faculties and 30 PhD students/postdocs and provides a lively and dynamic work environment.

Please feel free to circulate this announcement.

Best wishes

Giovanni S. Alberti Machine Learning Genoa (MaLGa) Center Department of Mathematics University of Genoa

From: "noreply@iopscience.org" <noreply@iopscience.org> Date: May 6, 2020 Subject: Inverse Problems, Volume 36, Numbers 2 and 5, 2020

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Preface:

Generalized Radon transforms and applications in tomography Gaik Ambartsoumian and Eric Todd Quinto

Preface to special issue on joint reconstruction and multi-modality/multi-spectral imaging Simon R Arridge, Martin Burger and Matthias J Ehrhardt

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Factorization of the translation kernel for fast rigid image alignment Aaditya Rangan, Marina Spivak, Joakim Andén and Alex Barnett

CGO-Faddeev approach for complex conductivities with regular jumps in two dimensions Ivan Pombo

Cryo-EM reconstruction of continuous heterogeneity by Laplacian spectral volumes Amit Moscovich, Amit Halevi, Joakim Andén and Amit Singer

Dynamic inverse wave problems-part I: regularity for the direct problem Thies Gerken and Simon Grützner

Dynamic inverse wave problems-part II: operator identification and applications Thies Gerken

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Determining both the source of a wave and its speed in a medium from boundary measurements Christina Knox and Amir Moradifam

Reconstruction of the principal coefficient in the damped wave equation from Dirichlet-to-Neumann operator Vladimir Romanov and Alemdar Hasanov

Uniqueness in inverse cavity scattering problems with phaseless near-field data Deyue Zhang, Yinglin Wang, Yukun Guo and Jingzhi Li

Density matrix reconstructions in ultrafast transmission electron microscopy: uniqueness, stability, and convergence rates Cong Shi, Claus Ropers and Thorsten Hohage

A denoising model adapted for impulse and Gaussian noises using a constrained-PDE L Afraites, A Hadri and A Laghrib

Compton scattering tomography in translational geometries James Webber and Eric L Miller

Persistent homology detects curvature Peter Bubenik, Michael Hull, Dhruv Patel and Benjamin Whittle

Fast acoustic source imaging using multi-frequency sparse data Ala Alzaalig, Guanghui Hu, Xiaodong Liu and Jiguang Sun

Sparse reconstructions from few noisy data: analysis of hierarchical Bayesian models with generalized gamma hyperpriors Daniela Calvetti, Monica Pragliola, Erkki Somersalo and Alexander Strang

Inverse transport problem in fluorescence ultrasound modulated optical tomography with angularly averaged measurements Wei Li, Yang Yang and Yimin Zhong

Sparsity and level set regularization for near-field electromagnetic imaging in 3D A J Hiles and O Dorn

Sharp stability estimate for the geodesic ray transform Yernat M Assylbekov and Plamen Stefanov

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https://iopscience.iop.org/issue/0266-5611/36/2

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Special Issue Papers:

Sampled limited memory methods for massive linear inverse problems Julianne Chung, Matthias Chung, J Tanner Slagel and Luis Tenorio

Tomographic reconstruction with spatially varying parameter selection Yiqiu Dong and Carola-Bibiane Schönlieb

Discrete total variation of the normal vector field as shape prior with applications in geometric inverse problems Ronny Bergmann, Marc Herrmann, Roland Herzog, Stephan Schmidt and José Vidal-Núñez

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The quadratic Wasserstein metric for inverse data matching Björn Engquist, Kui Ren and Yunan Yang

Projected Newton method for noise constrained Tikhonov regularization J Cornelis, N Schenkels and W Vanroose

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One-bit compressed sensing via ℓp (0 < p < 1)-minimization method Jingyao Hou, Jianjun Wang, Feng Zhang and Jianwen Huang

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An inverse source problem for distributed order time-fractional diffusion equation Chunlong Sun and Jijun Liu

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Data completion method for the Helmholtz equation via surface potentials for partial Cauchy data Matthieu Aussal, Yosra Boukari and Houssem Haddar

A new class of accelerated regularization methods, with application to bioluminescence tomography Rongfang Gong, Bernd Hofmann and Ye Zhang

A Bayesian filtering approach to layer stripping for electrical impedance tomography D Calvetti, S Nakkireddy and E Somersalo

On the local Lipschitz stability of Bayesian inverse problems

Björn Sprungk A partial data problem in linear elasticity Moritz Doll, André Froehly and René Schulz https://iopscience.iop.org/issue/0266-5611/36/5 From: "alerts@tandfonline.com" <alerts@tandfonline.com> Date: Saturday, May 23, 2020 Subject: Inverse Problems in Science and Engineering, Volume 28, Issue 5, May 2020 is now available online on Taylor & Francis Online Inverse Problems in Science and Engineering May 2020 Volume 28, Issue 5 Table of Contents Editorial: Celebration of 90th birthday of James Vere Beck Keith A. Woodbury Articles: Calculation of the inverse kinematics solution of the 7-DOF redundant robot manipulator by the firefly algorithm and statistical analysis of the results in terms of speed and accuracy Serkan Dereli & Raşit Köker Reliability assessment and data inversion using a surrogate model of wave propagation in functionally graded materials Marcos A. Capistrán, Pham Chi Vinh & Tran Thanh Tuan Finite dimensional iteratively regularized Gauss-Newton type methods and application to an inverse problem of the wave tomography with incomplete data range O. V. Karabanova, M. Yu. Kokurin & A. I. Kozlov Numerical solution of the inverse problem of thermal diagnostics of friction in a system of radial sliding bearings with an account of rotation of the shaft N. P. Starostin & R. S. Tikhonov Inversing fracture parameters using early-time production data for fractured wells Zixi Guo, Yiyu Chen, Xiang Zhou & Fanhua Zeng Rotating machinery health evaluation by modal force identification Tobias Souza Morais, Leandro de Souza Leão, Aldemir Ap Cavalini Jr & Valder Steffen Jr A shape design problem in determining the optimal geometry of wavy-shaped inverted fins Cheng-Hung Huang & Po-Wei Tung A new method based on polynomials equipped with a parameter to solve two parabolic inverse problems with a nonlocal boundary condition

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https://www.tandfonline.com/toc/gipe20/28/5
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