

Journal of Optimization Theory and Applications

Call For Papers

Special Issue on: "Inverse Problems and Optimization"

In light of: [International Conference on Mathematical Modelling in Applied Sciences](#)
July 24-28, 2017, St. Petersburg, Russia
<http://icmmas.alpha-publishing.net>

In physical sciences, a nonlinear system is a system for which the output is not directly proportional to the input. Nonlinear problems are of interest to engineers, physicists and mathematicians and many other scientists because most systems are inherently nonlinear in nature. Nonlinear systems may appear chaotic, unpredictable or counterintuitive, contrasting with the much simpler linear systems. As nonlinear equations are difficult to solve, nonlinear systems are commonly approximated by linear equations. This works well up to some accuracy and some range for the input values, but some interesting phenomena such as solitons, chaos and singularities are hidden by linearization. It follows that some aspects of the behavior of a nonlinear system appear commonly to be counterintuitive, unpredictable or even chaotic. Although such chaotic behavior may resemble random behavior, it is absolutely not random. For example, some aspects of the weather are seen to be chaotic, where simple changes in one part of the system produce complex effects throughout. This nonlinearity is one of the reasons why accurate long-term forecasts are impossible with current technology.

The field of inverse problems is very important for data processing in physics, chemistry, economics,..., etc. In science, it is the process of calculating from a set of observations the causal factors that produced them. It is called an inverse problem because it starts with the results and then calculates the causes. This is the inverse of a forward problem, which starts with the causes and then calculates the results. Inverse problems are some of the most important mathematical problems in science and mathematics because they tell us about parameters that we cannot directly observe. They have wide application in optics, radar, acoustics, communication theory, signal processing, medical imaging, computer vision, geophysics, oceanography, astronomy, remote sensing, natural language processing, machine learning, nondestructive testing, and many other fields. Inverse problem theory is used extensively in weather predictions, oceanography, hydrology and petroleum engineering. It is also found in the field of heat transfer, where a surface heat flux is estimated outgoing from temperature data measured inside a rigid body.

In mathematics and computer sciences, an optimization problem is the problem of finding the best solution from all feasible solutions. It can be divided into two categories depending on whether the variables are continuous or discrete. An optimization problem with discrete variables is known as a combinatorial optimization problem. In a combinatorial optimization problem, we are looking for an object such as an integer, permutation or graph from a finite (or possibly countable infinite) set. Problems with continuous variables include constrained problems and multimodal problems.

Upon making some appropriate formulations and combinations on above areas, and by adapting the techniques and ideas that were discussed at [ICMMAS'17](#), one can introduce and treat new future directions and open problems which can be applicable in real life.

This special issue will consider substantially extended versions of papers presented at the conference [ICMMAS'17](#) as well as external submissions. We strictly invite strong contributions that were discussed and improved during the scientific meeting together with interesting complementary novel articles. More precisely, original results obtained from advanced theoretical, experimental and applied aspects in nonlinear direct, well-posed, ill-posed and inverse problems associated with optimization/variational analysis and detours are welcomed. It is necessary that the papers have to have a high level mathematical ground. Note that submitted papers should be explicitly meeting with the [Aims and Scope](#) of JOTA journal.

Topics to be included

- Modern techniques in nonlinear optimization problems
- Computational methods for nonlinear direct optimization systems
- Optimality properties for nonlinear dynamics
- Inverse optimization problems: Modelling and Simulation
- Well & ill-posed optimization problems in applied sciences
- Latest advancements in nonlinear optimal inverse problems
- Applications of optimization problems in biology and medicine
- Nonlocal and impulsive direct systems: Optimization approach

Instructions for Submission

Authors are encouraged to submit original papers, not published or submitted elsewhere, to a special issue of [Journal of Optimization Theory and Applications](#).

The submission website for this journal is located at: [Submission Online](#). To ensure that your manuscripts are correctly identified for possible inclusion into the special issue we are editing, it is important that authors select [SI: IPAO 2017](#) when they reach the "Article Type" step in the submission process and [Special Issue: IPAO 2017](#) when they reach the section/category step.

The papers should be written in English, carefully checked for correct grammar and spelling. Each paper should clearly indicate the nature of its scientific contribution. Manuscripts should be prepared using LaTeX and followed the JOTA [Instruction for Authors](#). Submission of a manuscript will be understood to mean that the paper is not being considered for publication elsewhere. Papers that are not prepared according to the above instructions or badly written will be immediately rejected. All papers will be subject to a peer review process.

Important Dates

- ❖ Deadline for initial submissions of papers: November 30, 2017
- ❖ Full publication: According to journal arrangement

Guest Editors

Prof. Marc Bonnet,
École Nationale Supérieure de Techniques Avancées, France
marc.bonnet@ensta.fr

Prof. Amar Debbouche
Guelma University, Algeria
amar_debbouche@yahoo.fr

Prof. Juan J. Nieto
University of Santiago de Compostela, Spain
juanjose.nieto.roig@usc.es



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