Special issue on the random search problem: trends and perspectives

CALL FOR PAPERS

Special issue on the random search problem: trends and perspectives

This is a call for contributions to a special issue of *Journal of Physics A: Mathematical and Theoretical* dedicated to the subject of the random search problem. The motivation behind this special issue is to summarize in a single comprehensive publication, the main aspects (past and present), latest developments, different viewpoints and the directions being followed in this multidisciplinary field. We hope that such a special issue could become a particularly valuable reference for the broad scientific community working with the general random search problem.

The Editorial Board has invited Marcos G E da Luz, Alexander Y Grosberg, Ernesto P Raposo and Gandhi M Viswanathan to serve as Guest Editors for the special issue.

The general question of how to optimize the search for specific target objects in either continuous or discrete environments when the information available is limited is of significant importance in a broad range of fields. Representative examples include ecology (animal foraging, dispersion of populations), geology (oil recovery from mature reservoirs), information theory (automated researchers of registers in high-capacity database), molecular biology (proteins searching for their sites, e.g., on DNA), etc.

One reason underlying the richness of the random search problem relates to the 'ignorance' of the locations of the randomly located 'targets'. A statistical approach to the search problem can deal adequately with incomplete information and so stochastic strategies become advantageous. The general problem of how to search efficiently for randomly located target sites can thus be quantitatively described using the concepts and methods of statistical physics and stochastic processes.

Scope

Thus far, to the best of our knowledge, no recent textbook or review article in a physics journal has appeared on this topic. This makes a special issue with review and research articles attractive to those interested in acquiring a general introduction to the field. The subject can be approached from the perspective of different fields: ecology, networks, transport problems, molecular biology, etc. The study of the problem is particularly suited to the concepts and methods of statistical physics and stochastic processes; for example, fractals, random walks, anomalous diffusion. Discrete landscapes can be approached via graph theory, random lattices and complex networks. Such topics are regularly discussed in *Journal of Physics A: Mathematical and Theoretical*. All such aspects of the problem fall within the scope and focus of this special issue on the random search problem: trends and perspectives'.

Editorial policy

All contributions to the special issue will be refereed in accordance with the refereeing policy of the journal. In particular, all research papers will be expected to be original work reporting substantial new results. The issue will also contain a number of review articles by invitation only. The Guest Editors reserve the right to judge whether a contribution fits the scope of the special issue.

Guidelines for preparation of contributions

- We aim to publish the special issue in August 2009. To realize this, the DEADLINE for contributed papers is **15 January 2009**.
- There is a page limit of 15 printed pages (approximately 9000 words) per contribution. For papers exceeding this limit, the Guest Editors reserve the right to request a reduction in length. Further advice on document preparation can be found at `www.iop.org/Journals/jphysa`.
- Contributions to the special issue should, if possible, be submitted electronically by web upload at `www.iop.org/Journals/jphysa` or by e-mail to `jphysa@iop.org`, quoting 'JPhysA Special Issue—Random Search Problem'. Please state whether the paper has been invited or is contributed. Submissions should ideally be in standard LaTeX form. Please see the website for further information on electronic submissions.
- Authors unable to submit electronically may send hard copy contributions to: Publishing Administrators, Journal of Physics A, Institute of Physics Publishing, Dirac House, Temple Back, Bristol BS1 6BE, UK, enclosing the electronic code on CD if available and quoting 'JPhysA Special Issue—Random Search Problem'.
- All contributions should be accompanied by a read-me file or covering letter giving the postal and e-mail addresses for correspondence. The Publishing Office should be notified of any subsequent change of address.

This special issue will be published in the paper and online version of the journal. The corresponding author of each contribution will receive a complimentary copy of the issue.

Marcos G E da Luz, Alexander Y Grosberg, Ernesto P Raposo and Gandhi M Viswanathan
Guest Editors