

The Swarm Intelligence Based (SIB) Method 2.0: Two Enhancements and Their Applications in Statistics

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VENUE CS Seminar Room, Y6405
6th Floor, Yellow Zone
Yeung Kin Man Academic Building
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ABSTRACT

Evolutionary algorithm is a new and promising method to statistical optimization. Recently, a nature-inspired metaheuristic method, namely the Swarm Intelligence Based (SIB) method, was proposed for efficient optimization in discrete and continuous domains, but it is restricted use due to several constraints. In this work, we enhanced the standard framework of the SIB method by adding two enhancements: a smart initialization via MCMC and a new VARY operation for varying particle size. The first enhancement greatly improves the particle convergence towards optimum and we applied it in the search of minimum energy designs. The resulting designs are better than the proposed designs in the literature and they have great uses in the computer experiments. The second enhancement allows the particle sizes to vary to the optimum and we applied it to the change point analysis. Simulations show excellent detection accuracy and small deviation from the true models. We also apply this method to the data analysis of global surface temperature change.

BIOGRAPHY

Frederick Kin Hing Phoa has been an Associate Research Fellow of the Institute of Statistical Science at Academia Sinica (ISSAS) since 2013. He received his B.S. Physical Chemistry, B.S. Applied Mathematics, M.S. Statistics and Ph.D. Statistics from University of California at Los Angeles (UCLA) in 2001, 2002, 2006 and 2009 respectively. He was an Assistant Research Fellow of the ISSAS in 2009-2013. He conducted the Excellent Young Researcher Research Project supported by Ministry of Science and Technology (MOST) during 2013-2016. He received the Career Development Award from Academia Sinica in 2014. He received the Ta-You Wu Memorial Award (Young Researcher Award) from MOST. He received the best paper award in the World Congress of Engineering in 2015. He received an International Cost-Share Exchange Scheme funded by MOST and Royal Society of UK during 2016-2018. In the past eight years (2009-2017), he has published 44 papers in the areas of design and analysis of experiments, network data analysis, nature-inspired metaheuristic optimization and many others. In addition, he has given 88 invited talks in the international conferences and 59 seminar talks in the universities around the world. His research areas are Design and Analysis of Experiments, Social Network Analysis, Nature-Inspired Metaheuristic Optimization, Big Data Analytics, Parallel Computing, Internet Data Analysis, Financial Data Analysis, Change Point Analysis, Stochastic Process and Control, Uncertainty Quantification.

All are welcome!



In case of questions, please contact Dr WONG Ka Chun at Tel: 3442 8618, E-mail: kc.w@cityu.edu.hk, or visit the CS Departmental Seminar Web at <http://www.cs.cityu.edu.hk/news/seminars/seminars.html>.

