

Department of Systems Engineering and Engineering Management

Seminar Series

A Smart Initialization on the Swarm Intelligence Based Method for Efficient Search of Optimal Minimum Energy Design

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Date	22 June 2018 (Friday)
Time	10:30am - 11:30am
Venue	P7510, 7/F, Yeung Kin Man Academic Building

Abstract

Swarm intelligence is well-known to enjoy fast convergence towards optimum. Recently, the Swarm Intelligence Based (SIB) method was proposed to deal with discrete optimization problems in mathematics and statistics. Whether it was the traditional framework or the augmented version, the initialization of the particles were always done randomly. In this work, we introduced a smart initialization procedure to improve the computational efficiency of the SIB method. We demonstrated the use of the SIB method, initialized by both the uniform pool (standard procedure) and the MCMC pool (smart initialization), on the search of optimal minimum energy designs, which were a new class of designs for computer experiments that considered uneven or functional gradients on the search domain. We compared two initialization approaches and showed that the SIB method with smart initialization could save much experimental resources and obtain better optimal solutions within equivalent number of iterations or time.

About the Speaker

Frederick Kin Hing Phoa is an associate research fellow of Institute of Statistical Science at Academia Sinica in Taiwan. He has been with ISSAS since 2009, after his graduation from University of California at Los Angeles. His primary research areas of interest include design and analysis of experiments; methods of variable/model selection; network data and internet data analysis; nature-inspired metaheuristics optimization; big data analytics; semiparametric methods in data with missing covariates; and statistical control. Dr. Phoa has published scientific articles in statistical research journals including The Annals of Statistics, Statistica Sinica, Technometrics and many others, in interdisciplinary and computing research journals including Physical Review B, Physica A, Network Science, Chemometrics, Swarm and Evolutionary Optimization and many others. Dr. Phoa is the recipient of Career Development Award (Academia Sinica) (2014), Ta-You Wu Award (MOST Young Researcher Award) (2015), Best Paper Award at World Congress of Engineering (2015) and Outstanding Research Award (MOST) (2018). Dr. Phoa received a two-year international cost-share exchange support between MOST (Taiwan) and Royal Statistical Society (UK) in 2016. During 2009-2017, Dr. Phoa has published 46 papers. He has also given 90 conference oral presentations and 59 seminar talks. He actively participates in the session organizations of many international conferences, featuring two Conference of Experimental Designs and Analysis (CEDA) in 2014 and 2016 that Dr. Phoa serves as the organizer of both conferences.

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All are Welcome!