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SEMINAR

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THE CHINESE UNIVERSITY OF HONG KONG

Particle Swarm Optimization as a general-purpose optimization tool

INVITED SPEAKER

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TIME

December 27, 2024 (Fri) · 10:30 am - 11:30 am

VENUE

LSB LT2 (1/F) · Lady Shaw Building LT2 · CUHK

ABSTRACT

Particle Swarm Optimization (PSO) algorithm is based on swarm intelligence and widely used in the field of Artificial Intelligence. Like many other nature-inspired metaheuristic algorithms, it is already widely used to tackle all sorts of hard optimization problems across disciplines, particularly in engineering and computer science. Interestingly, it is less used in the statistical sciences. Their meteoric rise in popularity is due to their ease of use, speed, availability of codes across different platforms and above all, their apparent lack of technical assumptions for them to work reasonably well. I focus on an exemplary algorithm PSO and, as examples, present some of the recent applications of PSO to find challenging optimal designs in the biomedical sciences. They include extensions of Simon's two-stage designs to multiple stages, and theory-based dose response designs for estimating the optimal biological dose in early phase clinical trials. If time permits, I will also discuss PSO variants and design strategies for accommodating design problems with multiple objectives.