数学与系统科学研究院学术报告

报告题目：Toward a New Framework for Population-Based Optimization Methods

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摘要：Combinatorial optimization problems arise in many applications, e.g., task assignment, facility location, and elevator scheduling.   A variety of population-based methods have been used to solve these problems, such as genetic algorithm (GA), particle swarm optimization (PSO), estimation of distribution algorithms (EDA), and nested partitions (NP).   Some of them, however, lack global convergence guarantee such as PSO, or require strict convergence assumptions such as NP.   To enhance these methods in terms of convergence, a novel framework towards unifying the seemingly unrelated methods is established as iterative sampling and updating of a population distribution, and the methods that fit into this framework are called population distribution-based methods. Global convergence conditions for this framework are innovatively developed by building a shadow NP structure for the population evolution process. The result is generic and is capable of covering or enhancing the current convergence results of many methods including GA, PSO, EDA, and NP.   It can be further exploited to improve algorithm performance or computational efficiency, and opens up a new door to re-examine old methods and create new ones.

报告人简介：

Peter B. Luh received his B.S. in Electrical Engineering from National Taiwan University, M.S. in Aeronautics and Astronautics from M.I.T., and Ph.D. in Applied Mathematics from Harvard University.   He has been with the University of Connecticut since 1980, and currently is the SNET Professor of Communications & Information Technologies and Head of the Department of Electrical and Computer Engineering.   He is a Fellow of IEEE, the Vice President for Publication Activities for IEEE Robotics and Automation Society, an Associate Editor of *IIE Transactions on Design and Manufacturing*, *Discrete Event Dynamic Systems*, and *ACTA Automatica Sinica*; and was the founding Editor-in-Chief of the new *IEEE Transactions on Automation Science and Engineering* (2003-2007), the Editor-in-Chief of *IEEE Transactions on Robotics and Automation* (1999-2003).   He is also a member of the Chair Professors Group, Center for Intelligent and Networked Systems Dept. of Automation, Tsinghua University, Beijing, China.   His interests include design of auction methods for smart electricity markets; electricity load and price forecasting with demand management; optimized resource coordination for sustainable and green environment; planning, scheduling, and coordination of design, manufacturing, and service

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