

Title: Swarm based algorithms, complex systems and applications

Evolutionary computation as well as complex systems dynamics and structure is a vibrant area of research in the last decades. Swarm algorithms, memetic algorithms and evolutionary algorithms in general are subject of hybridization with unconventional algorithms and techniques that improve their performance and/or help to analyse and better understanding of their inner dynamics, that can be complex and even often chaotic or exhibiting various interesting patterns. And vice-versa those algorithms are used for better understanding, fine tuning, synthesis and control of complex dynamical systems. These mutual intersections thus have become a vitally important part of science and engineering at the theoretical as well as the practical level of research. Most notable examples include chaos control and synchronization, chaotic dynamics for pseudo-random number generators in swarm/evolutionary algorithms, modelling of their dynamics like complex networks, use of chaos game with swarm/evolutionary algorithms and/or using of evolution in complex systems design and analysis (evolutions in complex networks). Recently, the study of such phenomena is focused not only on the traditional trends but also on the understanding and analysis of principles, with the new intention of controlling and utilizing it toward real-world applications.

This special session is concerned about modelling and analysis of swarm/evolutionary dynamics as a complex system, and complex systems that can be modelled, controlled and optimized by means of swarm based algorithms.

Scope and Topics:

The proposed special session aims to bring together theories and applications of mutual connection between swarm/evolutionary based algorithms and complex systems. Topics of interest include, but are not limited to:

- Swarm based algorithms for complex systems.
- Complex systems for swarm based algorithms.
- Swarm based algorithms dynamics as a complex network.
- Mutual relations amongst swarm/evolutionary dynamics, complex network and its analysis.
- Evolutionary dynamics as a feedback loop system, analysis and control.
- Randomness, chaos and fractals in evolutionary dynamics and its impact on algorithm performance.
- Recent advances of swarm/evolutionary algorithms in better understanding, fine tuning, synthesis and control of complex dynamical systems.
- Evolutions in complex networks.
- Complex and evolutionary systems for data mining and modelling.
- Complex and evolutionary methods in soft computing and fuzzy systems.

Organizers:

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