

Title: Heterogeneous Particle Swarm Optimization Algorithms

Most particle swarm optimization (PSO) algorithms have particles that exhibit the same search behavior, where a behavior is defined as the way in which velocities and positions are updated.

Such PSO algorithms are referred to as homogeneous PSO algorithms. This talk will present an alternative approach, referred to as heterogeneous PSO algorithms, where a swarm will contain particles that follow different search behaviours. The different search behaviours are borrowed from different homogeneous PSO algorithms. It will be shown that the different homogeneous PSO algorithms have different diversity profiles, and therefore different exploration-exploitation trade-offs.

By combining these different behaviors in a behavior pool, and allowing particles to select the behaviour to follow, we obtain a swarm with particles that exhibit different exploration and exploitation behaviors. A number of different approaches to select behaviors will be discussed, including random selection, and self-adaptive selection schemes.