

## **Particle swarm optimization applied to sensor selection for aircraft engines**

A New Particle Swarm Optimization (NPSO) method is proposed and comparisons are made to the traditional Particle Swarm Optimizer (PSO) invented by Kennedy and Eberhart in 1995. PSO is motivated by the social behavior of organisms, such as bird flocking and fish schooling. Each particle studies its own previous best solution to the optimization problem, and its group's previous best, and then adjusts its position (solution) accordingly.

The optimal value will be found by repeating this process. In the NPSO proposed here, each particle adjusts its position according to its own previous worst and its group's previous worst to find the optimal value. Simulation will show that NPSO converges faster than PSO in several benchmark functions.

Mathematical analysis will also show the advantages of NPSO over PSO. Aircraft engine sensor selection (for health parameter estimation) is an NP-complete problem. In this dissertation, PSO and/or NPSO will be applied to the problem, and advantages over other sensor selection approaches will be demonstrated.