Ant Colony System and Its Application to Chemical Engineering Problems

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The Ant Colony System is a probabilistic technique for solving computational problems which can be reduced to finding good paths through graphs. They were inspired by the behavior of ants in finding paths from the colony to food. In the real world, ants (initially) wander randomly, and upon finding food return to their colony while laying down pheromone trails. If other ants find such a path, they are likely not to keep traveling at random, but to instead follow the trail, returning and reinforcing it if they eventually find food. The idea of the ant colony algorithm is to mimic this behavior with "simulated ants" walking around the graph representing the problem to solve. Ant colony system has been used to produce near−optimal solutions to the traveling salesman problem. They have an advantage over simulated annealing and genetic algorithm approaches when the graph may change dynamically. In this work, we followed the in−hand typical dynamic optimization problem and some test problems elaborated by former researchers. During the latter application session, these dynamic optimization problems will be tested and compared with the results which were gained from other methods by the former researchers.