Simulated Kalman Filter Optimization Algorithm for Maximization of Wireless Sensor Networks Coverage

Nor Azlina Ab. Aziz
Faculty of Engineering and Technology
Multimedia University
Melaka, Malaysia
azlina.aziz@mmu.edu.my

Kamarulzaman Ab Aziz
Faculty of Engineering and Technology
Multimedia University
Melaka, Malaysia

Zuwairie Ibrahim
Faculty of Manufacturing Engineering
Universiti Malaysia Pahang
Pahang, Malaysia
zuwairie@ump.edu.my

Nor Hidayati Abdul Aziz
Faculty of Engineering and Technology
Multimedia University
Melaka, Malaysia
hidayati.aziz@mmu.edu.my

Abstract:
Simulated Kalman Filter (SKF) is a population based optimization algorithm inspired by the Kalman filtering method. It had been successfully used for optimization of many engineering problems. In this work SKF is applied for wireless sensor networks (WSN) coverage optimization problem, where the objective is to maximize the area covered by the sensors in a region of interest. Coverage is an important issue in WSN. It is used as one of the measurement metric for a WSN's quality of service. Many metaheuristics algorithms had been applied to solve this problem. Here, SKF is tested over several WSN and found to be able to perform better than particle swarm optimization (PSO) and genetic algorithm (GA) in improving WSN coverage.

Keywords: coverage; binary sensing model; simulated Kalman filter; wireless sensor networks