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Editorial

Particle Swarm Optimization Methods for the Harmonic Reduction

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EDITORIAL NOTE

Particle Swarm Optimization (PSO) is one among the foremost well-known metaheuristics; it had been proposed by Kennedy and Eberhart. This algorithm is inspired from swarm behavior like bird flocking and schooling in nature. PSO has been widely used and it's the inspiration for a replacement research area called swarm intelligence.

Natural creatures sometimes behave as a swarm. One among the most streams of artificial life researches is to look at how natural creatures behave as a swarm and reconfigure the swarm models inside a computer. Swarm behavior is often modeled with a couple of simple rules. School of fishes and swarm of birds are often modeled with such simple models. Namely, albeit the behavior rules of every individual (agent) are simple, the behavior of the swarm is often complicated. Reynolds called this type of agent as boid and generated complicated swarm behavior by 3D animation.

Modified particle swarm optimization (MPSO) was proposed by Eberhart and Shi in 1997 and 1998. During this algorithm, the birds have a memory about the previous best and worst positions in order that particles have 2 experiences; a nasty experience helps each particle to recollect its previous worst position. To calculate the new velocity, the bad experience of every particle is taken into account.

In the Weight improved particle swarm optimization (WIPSO) algorithm, so as to enhance the worldwide search quality of ordinary PSO, the inertia weight factor and therefore the cognitive and social components are configured.

THE PROCEDURE FOR IMPLEMENTING OF THREE STUDIED OPTIMIZATIONS

The proposed algorithms are easy to use and are computationally efficient. θi vector for an 11-level inverter is [θi1, θi2, . . . , θi5] and θi is additionally represented to the ith particle of the swarm. The weather of θi is the solutions of the target function, and therefore the dth element corresponds to the dth switching angle of the inverter.

- First, initialize the specified parameters of the algorithm like maximum iteration number, population size M, and etc.
- Determine the initial conditions of every particle, a population of particles are randomly initialized between 0 and $\pi/2$ and therefore the velocity vector of every particle are randomly generated between Vmax and Vmin. At now, the dimension of every particle is adequate to the amount of H-bridges during a cascaded multilevel inverter and also switching angles. A 2Slevel inverter requires S H-bridges; thus, in an 11-level H-bridge inverter we'll have 5 switching angles, θ1, θ2,..., θ5.
- For every particle, the specified optimization fitness function for s variables is decided. The most purpose of this paper is to attenuate specified harmonics. The value function is given in Equation.
- For updating the private best position of the particles within the minimization process of the value function in Equation, compare ith particle fitness evaluation with its previous personal best position.
- If the private better of the particles has the simplest position thus far, replace this personal best, which is named the worldwide best with the previous one.
- Update the speed and position of the particle by equations and repeat the optimization process to urge the specified solution.
- If the iteration counter reaches the ITEmax, stop the method to seek out the ultimate result; else, increase the iteration counter and repeat the method from step.

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