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改进PSO算法的性能分析与研究*

Performance analyzing and researching of improved PSO algorithm

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中文关键词: [粒子群优化\(PSO\)](#) [遗传PSO](#) [二阶振荡PSO](#) [量子PSO](#) [模拟退火PSO](#)

英文关键词: [particle swarm optimization\(PSO\)](#) [genetic PSO](#) [SOPSO](#) [QPSO](#) [SAPSO](#)

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中文摘要:

分析了粒子群优化(PSO)算法的进化式, 针对其容易发生早熟、收敛速度慢、后期搜索性能和个体寻优能力降低等缺点, 结合遗传算法的思想, 提出一种新的混合PSO算法——遗传PSO(GAPSO)。该算法是在PSO算法的更新过程中, 对粒子速度引入遗传算法的变异操作, 对粒子位置引入遗传算法交叉操作。对速度的变异降低了算法后期因种群过于密集而陷入局部最优的可能, 对位置的交叉使得父代中优良个体的基因能够更好地遗传给下一代, 从而得到更优、更多样化的后代, 加快进化过程, 提高了收敛速度和群体搜索性能。选取了其他几种典型的改进PS

英文摘要:

To deal with the slow search speed, premature convergence and lower search performance and individual optimizing ability in late stage, this paper proposed a new PSO called genetic PSO. Produced mutation and crossover of GA into velocity and position updating of PSO. The mutation to velocity could reduce the possibility of the algorithm trapping in the local optimal because of the over dense of the population in late stage. The crossover to position could make the gene of excellent elder individuals passed down to the next generation, and by doing so, attained the more excellent and more various next generations, so increased the evolution and search performance of the population. Selected several other typical improved PSO algorithms for comparing and analyzing from implementing process, setting of parameters and optimization performance. To simulated annealing PSO, proposed a new annealing method which could increase the speed of implementation of the algorithm. The simulation experiments were done to the six selected Benchmark functions. The results show that the proposed algorithm not only speeded up the convergence, but also improved the search performance in late stage and could converge to the global optimal solution more efficiently. And lastly, presented the simulation of dynamic optimizing process of genetic PSO to the Griewank function so that converging process of the particles could be viewed vividly.

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