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A Novel Algorithm Applied to Task Scheduling in Grid Computing

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In this paper a novel optimal scheduling model and its algorithm are developed for task scheduling problems. A novel annealing-inspired genetic algorithm is applied to solve the scheduling model. The effectiveness of the algorithm is shown for a number of test problems and performance comparisons with the genetic algorithm, simulated annealing are also discussed.

Keywords Grid computings; Task scheduling

1. Introduction

In this paper, a novel annealing-inspired genetic algorithm (NAGA) is combined with GA and SA to find efficient solution to the grid task scheduling problem [1].

2. The Structure and Description of NAGA

The solution process of NAGA as follows:

Step 1: Generate an initial population $P(t)$, the size of the population popsize, the initial temperature T_0, $k = 0$;
Step 2: Select $P(k)$ to generate the parent population $F(k)$
Step 3: Crossover $F(k)$ to generate $C(k)$;
Step 4: Mutate $C(k)$ to generate $M(k)$;
Step 5: Generate the next population $P(k + 1) = F(k) \cup M(k)$;
Step 6: When the termination condition is coincident, outputs the result; otherwise, $T_{k+1} = T_k \times (1 - \frac{k}{popsize})$, $k = k + 1$, go to step 2.

3. Experiments and Conclusion

The experiment result shows that the algorithm static performance curve, and the time span of the algorithm in a different evolution algorithm, also effectively reveals that the NAGA

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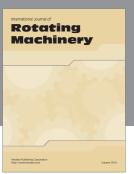
algorithm has good convergence speed and a reasonable choice mechanism ensures its good performance.
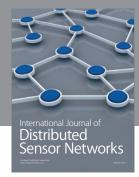
Reference

1. K. Taura, ''A heuristic algorithm for mapping communicating tasks on heterogeneous resources,'' *9th Heterogeneous Computing Workshop*, May 2000, Cancun, Mexico, pp. 102–118.