~~the initial population~~. ~~Initial population generate by random chromosomes~~Random chromosomes generate the initial population.

C. Fitness ~~function~~Function

The important part of ~~the genetic algorithm~~GA is the fitness function. The fitness function is defined over the genetic representation, and measures ~~the~~ quality of the chromosomes. The fitness function is always dependent ~~to~~ on the problem. In this ~~paper~~article, ~~The~~the fitness function separates ~~the~~ evaluation into two parts: lost tasks, and total response time. ~~Fitness~~ The fitness function in the first step is based on the number of lost tasks and ~~the~~ response time. ~~Fitness~~ the fitness function in the second step is ~~just~~ only based on ~~the~~ total response time.

The f~~F~~itness function is calculated according to the following equation:

$$F = (\alpha \times M) + ((1 - \alpha) \times TFT) \quad (2)$$

where M is the number of lost tasks, TFT is response time obtained from the chromosome~~.~~ , and α is a value between zero and one (α=[0,1]). If α = 1, then the evaluation is based on the number of lost tasks~~,~~ . If α = 0, then the evaluation is based on ~~the~~ total response time. α can have a value between 1 and 0, this value determines ~~how much important is the~~importance of the total response time, and ~~how much important is~~importance of the number of lost tasks.

~~Whatever~~ Lesser ~~the obtained~~ value ~~from the above equation be less~~of the above equation corresponds to a better~~,~~ fitness value ~~of~~ for the chromosome ~~is more and is better~~.

IV. Evaluation of Simulation Results

In this section, we present and discuss the experimental results of the proposed scheme. All simulations ~~is~~were performed ~~in~~ using MATLAB software. We evaluated the performance of our proposed scheme in comparison with LPT (Largest Processing Time) and SPT (Shortest Processing Time) algorithms in a ~~Parallel multi~~Parallel multi-processor system. The simulation ~~results shown~~results showed two instances: when the ~~number of tasks are~~numbers of tasks are more, and when the ~~number of tasks are~~numbers of tasks are less.

The parameters of ~~genetic algorithm considered~~the considered GA are as follows:

~~The n~~Number of generations = 40
Crossover probability= 50%
Mutation probability = 20%
Chromosomes that enter ~~unchanged for~~ the next generation unchanged = 30%
Number of GA iterations ~~Genetic Algorithm~~ = 200

When the number of tasks is 100, 60 tasks have deadlines and 40 tasks are without deadline.

Fig. 7: When the number of tasks is 100, tasks with deadlines = 60 ~~and tasks~~and tasks without deadline = 40

Figure 7 shows the number of lost tasks by applying ~~genetic~~ LPT and SPT genetic algorithms~~, LPT and SPT~~ for task~~s~~ scheduling on parallel multi-processor systems in these conditions.

The vertical axis represents the number of lost tasks, and the horizontal axis represents the number of processors. The blue line represents the results of genetic algorithm, and the green line represents the results of the LPT algorithm, ~~and~~ while the red line represents the results of the SPT algorithm.

Figure 8 shows the number of lost tasks~~, . when~~ When the number of tasks is 1000, 600 tasks have deadlines and 400 tasks are without deadline.

Fig. 8: When the number of tasks is 1000, tasks with deadlines = 600 ~~and tasks~~and tasks without deadline = 400

Figure 9 and 10 show~~s~~ the total response time~~,~~ when the number of tasks is 100 and 1000, respectively.

Fig. 9: ~~total~~ Total response time, when the number of tasks is 100

Our approach in addition to ~~reduce~~ reducing the number of lost ~~tasks,~~tasks provides good response time compared to the number of processed tasks. Since~~,~~ ~~the number of lost tasks are~~number of lost tasks is fewer in GA, ~~so~~ therefore, the ~~number of tasks to be processed are~~number of tasks to be processed is more, and the total response ~~time also~~time increases. However, the increase in total response time~~,~~ is not significant.

~~According to o~~Obtained results in large and small ~~scale, indicates~~scales indicate that our proposed method can provide similar results ~~at~~ in different scales, and ~~indicates~~ proves the robustness of the proposed method ~~at~~ in different scales.

Fig. 10: ~~total~~ Total response time, when the number of tasks is 1000

These obtained results are based on a limited number of reproduction and genetic simple operators. Certainly, gain the better results using of efficiently operators.

V. Conclusion

In this ~~study~~study, we proposed the Genetic Algorithm (GA) for task scheduling in certain heterogeneous parallel multiprocessor systems that ~~the~~ a number of tasks have deadlines, and number of tasks are without deadlines. In our approach, at first we scheduled tasks ~~scheduling that have~~with deadlines, and then tasks scheduling ~~that are~~ without deadlines. The proposed method found a better solution for assigning ~~the~~ tasks to the heterogeneous parallel multiprocessor system. ~~This method reduce the number of lost tasks and provide~~This method reduces the number of lost tasks and provides appropriate total response time compared to the number of processed tasks. The method proposed in this ~~paper~~ article was compared with ~~the~~ SPT and LPT algorithms. The results of ~~the~~ simulations indicate ~~better~~ that our method ~~in~~ is better ~~comparison~~ compared with the LPT and SPT algorithms. ~~Also~~In addition, the~~se~~ obtained results are based on a limited number of reproduction and genetic simple operators. Certainly, gain the better results using of efficiently operators.

Comment [Trans2412]: کدام شرایط؟

Comment [Trans2413]: اینگونه زیرنویس برای اشکال مناسب نیست، چراکه دقیقاً تکرار جمله پیشین در پاراگراف است. پیشنهاد می شود به صورت کلی و به گونه یا دیگر نوشته شود. به سایر اشکال نیز چنین ایرادی وارد است.

Comment [Trans2414]: جمله نامفهوم و نادرست. منظورتان از این جمله چیست؟

Comment [Trans2415]: تکرار جمله قبلی. منظورتان از این جمله چیست؟