CHAPTER 8

CONCLUSION AND FUTURE ENHANCEMENTS

8.1 SUMMARY OF CONTRIBUTIONS

This thesis has proposed scheduling approaches to improve resource utilization and task schedulability. Improvement in resource utilization and task schedulability has been achieved by reduction of overheads incurred due to task preemption and migration.

Four scheduling approaches have been proposed, namely modified proportionate fairness approach, non-uniform laxity based approach, non-uniform laxity based ranking with selective duplication approach and fuzzified non-uniform laxity based approach.

The first method, namely modified proportionate fairness approach, has achieved improved resource utilization and task schedulability by a migration window, which leads to reduction of overheads due to task preemption and migration. The second approach, namely non-uniform laxity based approach, has utilized the resource saved in the modified proportionate fairness approach, by cumulating the resource as slack, and utilizing the same for scheduling tasks arriving at a later point of time. The third approach, namely non-uniform laxity based ranking heuristic with selective duplication, has analyzed task dependencies and schedules dependent tasks with minimum communication cost. The last approach, namely the fuzzified non-uniform laxity, schedules tasks even when the scheduling parameters are not precisely
available, by specifying them as linguistic variables and handling them using a fuzzy inference engine.

8.2 POSSIBLE EXTENSIONS

This work proposes scheduling approaches that reduce overheads and addresses issues related to resource allocations and scheduling on multicore platforms. The schedulability and optimality can be further improved by the following enhancements:

1. The simulations presented for the proposed approaches can be extended to real-time implementations.

2. The slack cumulation methods can be modified to include deadline minimization techniques and a skewness factor to distribute slack effectively.

3. The non-uniform laxity-based ranking heuristic can be modified by incorporating constraints to reduce the computation cost.

4. Asymmetry in cores with respect to performance and functionalities can be incorporated in the proposed approaches to the scheduling performance.

Further, to conclude, it may be stated that this work has proposed multiple scheduling algorithms to be used with multi- and many-core processors, in such a way that, resources are effectively used and task schedulability is improved.