

## Abstract:

Software code migration to multicore platforms is increasing due to expected performance benefits. However, migrating applications is a complex, time consuming, and costly exercise. Hence, it is desirable to predict benefits before migration. Over the past decades, many researchers have attempted to predict this performance using Amdahl's law. Although simple to use, Amdahl's law based performance calculations do not result in desired prediction accuracy. In this paper, we propose a mathematical model based on detailed study of the parallelization process. We conducted various experiments on two Intel multicore processors. Based on initial results, we developed mathematical models for two widely used OpenMP parallelization constructs. Further, using our model, PPMIO, we predicted performances of PARSEC and other benchmark applications. Our comparative study shows that the average prediction error with Amdahl's law is 17.18% while with our model, PPMIO, it is 0.43%. This paper describes the model development, its usage, and performance benefits.

- 1) What domain does the problem fall in?
- 2) What is the problem and what is its importance?
- 3) What is the current scenario?
- 4) The identified and existing knowledge so far.
- 5) What are the shortcomings?
- 6) Where have they failed or where is the gap?
- 7) What is your approach?
  - a. What experiments have you conducted?
  - b. How many experiments should you carry out?
  - c. What did you do with the outcome?
- 8) What are your results? What are the results of the comparative study?
- 9) What is your conclusion?
- 10) Why are the results outstanding and astounding?