Parallel Numerical Methods

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Summary: The primary goal of the present lecture notes was to give an overview on the parallel algorithmic solutions of particular problems having numeric nature.

The first chapter is about observation methods, models and essentials of complexity theory. The next chapters contain some of the typical algorithms and their analysis of the discussed fields. The second chapter deals with general problems and their parallel solutions. The methods applied here appears at many places in the latter parts. Among others, different sorting algorithms are detailed and compared. In the further chapters certain fields are discussed (linear algebra, Fast Fourier Transformation, long arithmetic, interpolation, iteration, polinom evaluation, Monte Carlo method and random number generators) with a special attention on their possibility of parallelizing. The Fast Fourier Transformation may be highlighted, since it has one of the most efficient and smart parallel solution. Contrary, one can porve that the problem of exponentiation cannot be solved in an efficient way with parallel algorithm.

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