

Optimized Waveform Relaxation Methods

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Waveform relaxation algorithms have been developed to solve very large systems of ordinary differential equations in parallel. They achieve parallelism by partitioning the large system into subsystems and solving each subsystem separately, exchanging information between subsystems and iterating to convergence. The main drawback of waveform relaxation methods is their rather slow convergence. We investigate in this talk the reasons for the slow convergence rate for a circuit problem and show a remedy motivated by the physics of the underlying circuit. We present numerical experiments which confirm the greatly enhanced numerical performance of the optimized waveform relaxation algorithm and a preliminary analysis.