

An optimized Schwarz waveform relaxation algorithm for the linear Saint-Venant equations

M. J. Gander¹ and V. Martin²

¹Université de Genève, Switzerland

²Université de Picardie Jules Verne Amiens, France

Optimized Schwarz waveform relaxation (OSWR) algorithms are domain decomposition methods that apply to evolution problems. The spatial domain is split into overlapping or non-overlapping subdomains, and solving iteratively the time dependent equation in each subdomain leads then to the monodomain solution. The convergence rate of such algorithms can be computed using Fourier analysis, and it can be optimized such that the convergence is fast.

In this talk we consider the linear 1D-Saint-Venant equations, we derive an OSWR algorithm with Robin transmission conditions involving a real parameter p . The convergence speed depends on p and we show that the optimized p , solution of a min-max optimization problem, can be computed explicitly. We illustrate our results with numerical experiments.