Preconditioning the Elastic Wave Equation in 2D and 3D based on Inexact MSSS Matrix Computations

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Efficient preconditioners for high frequency wave propagation problems (Helmholtz problems) are a challenging field of application, and in particular for multigrid methods this class of problems is not well-suited. We present a preconditioning approach for the elastic wave equation that exploits the fact that the discretized operator has multilevel sequentially semiseparable (MSSS) matrix structure. Our algorithm works differently on each discretization level, and in this poster we want to put emphasis on the transition from 2D to 3D. The importance of our preconditioner in the context of frequency-domain Full-Waveform Inversion is demonstrated.

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