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FAST WAVE PROPAGATION BY MODEL ORDER REDUCTION*

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Abstract. Large scale wave propagation simulation is currently achievable in reasonable turnaround times by using distributed computing in multiple cpu clusters. However, if one needs to perform many such simulations, as is the case in optimization, tomography, or seismic imaging, then the resources required are still prohibitive. Model order reduction of large dynamical systems has been successfully used in several application domains to paliate that problem and in this paper we explore one of its manifestations, Proper Orthogonal Decomposition, for wave propagation. We describe the method and show how it can be easily interfaced with two different high fidelity simulators. We exemplify its use on several problems of increasing complexity and size.

Key words. wave propagation, model order reduction, proper orthogonal decomposition

AMS subject classifications. 65M99

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