MULTIPLE TRACES FORMULATION: A MARRIAGE BETWEEN DOMAIN DECOMPOSITION AND BOUNDARY ELEMENT METHODS

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Abstract. For the past few years, a novel kind of boundary integral formulations dubbed *Multiple Traces Formulations* (MTFs) have appeared aiming to tackle wave scattering by heterogenous objects. Broadly speaking, these formulations are characterized by regarding solution traces over each subdomain as independent unknowns and imposing adequate transmission weakly. Such an approach is reminiscent to the more established Domain Decomposition methods (DDMs) but portraying several novelties, in particular, considerable improvements over current DDM for wave propagation problems. Specifically, under general conditions, MTFs can be shown to be well posed, robust, parallelizable and either well conditioned or easy to precondition with Krylov methods converging quickly. In this talk, we will explain the construction of MTFs, their intrinsic properties and discuss several numerical implementations under high-performance computing environments along with some applications and future work.

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