IMPLEMENTATION OF LOCAL MULTIPLE TRACES FORMULATION FOR ELECTROMAGNETIC SCATTERING BY COMPLEX OBJECTS

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ABSTRACT. We consider the three-dimensional time-harmonic scattering transmission problem for complex scatterers. To approximate the fields, we introduce a local multiple-trace formulation [1, 2, 3], allowing the handling of junction points between sub-domains and resulting in efficient and parallel schemes. However, its practical implementation can be challenging, particularly in the context of 3D electromagnetic scattering. Therefore, we propose a new framework based on a skeleton (union of interfaces) approach and on swapping normal vectors' orientations. This enables the description of Calderón and transmission operators in their natural function spaces, thus resulting in a straightforward implementation of the local multiple-trace formulation. Consequently, we conduct multiple numerical experiments on increasingly complex objects, thereby demonstrating the method's scalability and applicability. Finally, we provide suggestions for future research avenues.

Keywords: Maxwell scattering, multiple-traces formulation, Boundary element methods.

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