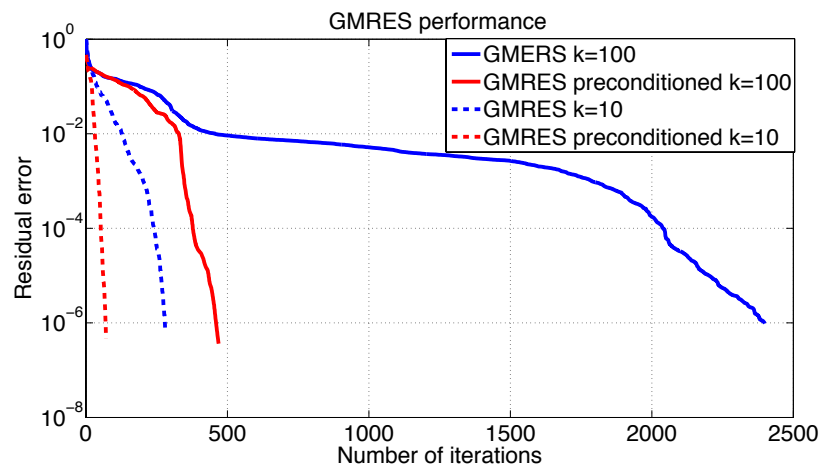# Multiple Traces Formulation for High-Frequency Scattering

C. Jerez-Hanckes, J. Pinto, S. Tournier

[*] School of Engineering, Pontificia Universidad Católica de Chile
Av. Vicuña Mackenna 4860, Macul, Santiago, Chile
cjerez@ing.puc.cl, jspinto@uc.cl, simon.tournier@gmail.com

ABSTRACT

We present an efficient method to solve high-frequency scattering problems by heterogenous penetrable objects in two dimensions. This is achieved by extending the so-called *Local Multiple Traces Formulation*, introduced recently by Hiptmair & Jerez-Hanckes, to purely spectral discretizations employing weighted Chebyshev polynomials. Together with regularization strategies to handle boundary integral operators singularities, matrix entries are quickly computed via the Fast Fourier Transform. The resulting Fredholm first-kind formulation is free from spurious resonances, and though ill-conditioned, it possesses built-in preconditioners based on Calderón-type techniques. Numerical results obtained for different settings validate our claims and greatly motivate future research in this direction.

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