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OPTIMAL GRIDS FOR ANISOTROPIC PROBLEMS*

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Abstract. Spectral convergence of optimal grids for anisotropic problems is both numerically observed and explained. For elliptic problems, the gridding algorithm is reduced to a Stieltjes rational approximation on an interval of a line in the complex plane instead of the real axis as in the isotropic case. We show rigorously why this occurs for a semi-infinite and bounded interval. We then extend the gridding algorithm to hyperbolic problems on bounded domains. For the propagative modes, the problem is reduced to a rational approximation on an interval of the negative real semiaxis, similarly to in the isotropic case. For the wave problem we present numerical examples in 2-D anisotropic media.

Key words. finite differences, DtN maps, anisotropy, spectral approximation

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