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A fractal approach to acoustic scattering by fractal screens

Sound-soft fractal screens can scatter acoustic waves even when they have zero surface measure. We report how to solve such scattering problems by a novel application of the boundary element method (BEM) where each BEM basis function is supported in a fractal set, and the integration involved in the formation of the BEM matrix is with respect to a non-integer order Hausdorff measure. In this way, for a class of fractals that are attractors of iterated function systems, convergence rates for the BEM can be proved under certain natural regularity assumptions on the solution of the underlying boundary integral equation.

This is joint work with S. N. Chandler-Wilde (Reading), A. Gibbs (UCL), D. P. Hewett (UCL) and A. Moiola (Pavia).