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*Fractal Potentials of the Laplace and Wave Equations*

The invariant measure introduced by Hutchinson is the fixed point of a contractive transfer operator, and it is supported on an IFS fractal. The Laplacian and the d'Alembertian operate on functions in Poisson's equation, in space and spacetime respectively. With appropriate boundary conditions at infinity, this equation induces a bijection between potentials and probability measures, which becomes an isometric isomorphism under certain metrics. It enables us to show the existence of an "invariant potential" of the appropriately generalized transfer operator, which corresponds uniquely to the invariant measure. This invariant potential is also referred to as a "fractal potential", a weakly harmonic function that satisfies the Laplace or Wave equations almost everywhere. Its singularities correspond to the support of the invariant measure, required to have vanishing Lebesgue measure.