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*The Inverse Problem of Fractal Potentials*

An inverse problem essentially involves finding parameters to a model so that it approximates an observed target phenomenon well. The latter is usually represented as a function in a metric space, while the approximating functions in our case are fixed points of a parametrized operator. Indeed, an iterated function system (IFS) and its associated weights induce a transfer operator over potential functions. For the direct problem to be well-posed, a unique fixed point of this operator must be shown to exist (while the inverse problem is not necessarily well-posed). This is therefore our primary focus for fractal potentials, which are the attractors of this transfer operator. An auxiliary bijective isometry is defined between the spaces of potential functions and probability measures, whereby the invariant / fractal potential corresponds to the well-known invariant measure of IFS.