# Optimal Grids for the Forward and Inverse Electric Impedance Tomography Problems

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In Electrical Impedance Tomography (EIT) one seeks to find the conductivity inside a body rom electrical measurements at its surface. This is an ill-posed inverse problem and finding appropriate parametrizations of the unknown is a crucial question.

We begin by reviewing optimal grid results for an 1D inverse problem [1], that gives a rigorous way of choosing an appropriate parameterization of the conductivity. The main idea is to fit the measurements exactly with a resistor network, and to interpret the resistors as local averages of the conductivity over the grid cells of a finite differences discretization. Next, we show how we can profit from a linearization of the resistors to improve over the performance of optimal grids in the 1D EIT forward problem.

Lastly, we discuss a generalization of the 1D methods to the 2D EIT inverse and forward problems, and show numerical results.

## REFERENCES

1. Borcea, L., V. Druskin, and L. Knizhnerman., "On the continuum limit of a discrete inverse spectral problem on optimal finite-difference grids," *Comm. Pure Appl. Math*, Vol. LVIII, 1231–1279, 2005.