

# Capacitance tomography and boundary element methods

Günther Of, Alexander Schwaigkofler, Olaf Steinbach

## Abstract

In this talk, we present a method for shape reconstruction from electrical capacitance tomography measurement data. The inverse problem to be solved corresponds to the minimization of a cost functional on the outer boundary. The shape derivative of the cost functional is computed by solving the forward problem and the corresponding adjoint problem. We consider an electrostatic field equation with piecewise constant material parameter for each subdomain. Thus, the forward problem and the adjoint boundary value problem can be solved by a boundary element domain decomposition method. A first order levelset method is used to describe the shape of the object to be identified, and the optimization problem is solved by a gradient method.

We explain our algorithm and discuss some numerical examples for 2D shape identification.