A Direct, Nonlinear Reconstruction Algorithm for the 2D EIT Problem Using a Partial data D-N Map

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Electrical Impedance Tomography (EIT) is a fairly new, portable, relatively inexpensive, real-time imaging system that requires no ionizing radiation and has applications including medical imaging, nondestructive testing, and underground prospecting. The aim of EIT is to recover the inner structure of a body via voltage-to-current density measurements performed only at its boundary. The imaging task of EIT is a nonlinear ill-posed inverse problem. D-bar methods have proved useful in solving the nonlinear EIT problem using the complete voltage-to-current density map. However in many practical applications of EIT, only a subset of the boundary is available for data acquisition. In this talk, a direct nonlinear D-bar reconstruction algorithm is introduced which uses the partial data voltage-to-current density map corresponding to the case where voltages are applied and current densities measured on the same subset of the boundary of a two-dimensional domain. Reconstructions from simulated data are presented.