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Title:
Free-surface and admittivity estimation in electrical impedance tomography

Abstract

In electrical impedance tomography (EIT) currents are applied through an array of electrodes attached on the surface of the object and the resulting voltages are measured using the same electrodes. Based on these voltage measurements an estimate for the internal admittivity distribution is computed. The reconstruction is usually made in a fixed pixel grid. However, if it is known that the object consists of a few separate subregions of different materials with constant admittivity values one can employ shape estimation methods. In this study, we propose a novel shape estimation method for the recovery of a free-surface which is an open interface between two regions of unknown admittivities. The motivation for the method stems from the industrial process tomography applications of EIT. We are especially interested in the estimation of free-surface between air and conductive liquid in industrial process pipelines, and in addition, in the estimation of free surface between oil and water. The proposed method is tested with computer simulations. From the simulations a promising performance of the approach can be seen.