Conformal mapping and electrostatic imaging

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We present the solution of an inverse boundary value problem for harmonic functions arising in electrostatic imaging through conformal mapping techniques. The numerical method consists of two parts. In a first step, by successive approximations a nonlinear equation is solved to determine the boundary values of a holomorphic function on the outer boundary circle of an annulus. Then in a second step an ill-posed Cauchy problem is solved to determine the holomorphic function in the annulus. We establish convergence results for the iteration procedure and through numerical examples we illustrate the feasibility of the method. This is joint work with I. Akduman, Istanbul, and H. Haddar, Paris.