

Inverse electrostatic problems on plane

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Abstract. We embed a system of neutral conductors $\Gamma_n = [u_n - ih_n, u_n + ih_n]$, $n \in \mathbb{Z}$, in the external homogeneous electrostatic field $E_0 = (0, -1) \in \mathbb{R}^2$ on the plane, for some $h \in \ell_{\mathbb{R}}^2$, where $u_n, n \in \mathbb{Z}$ is strongly increasing sequence of real numbers such that $u_n \rightarrow \pm\infty$ as $n \rightarrow \pm\infty$ and $u_{n+1} - u_n \geq 1$, $n \in \mathbb{Z}$. On each lower half of the conductor Γ_n there exists the induced charge positive $e_n \geq 0$. Moreover, there exists the bipolar moment d_n of the conductor Γ_n . Consider the mappings $h \rightarrow \{e_n\}_{n \in \mathbb{Z}}$ and $h \rightarrow \{d_n\}_{n \in \mathbb{Z}}$. We prove that these mappings are real analytic isomorphisms between some Banach spaces. In the proof we use nonlinear function analyses. We obtain the Löwner equations for $z(k, h)$ and study their basic properties when the heights h_n of the slits Γ_n are changed. This is a joint project with Pavel Kargaev.