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## Inverse estimates in BEM and their application to adaptivity

We show polynomial inverse estimates for the classical boundary integral operators associated with the Laplacian on shape-regular meshes $\mathcal{T}_h$. For example, for the single-layer integral operator $V$ on the boundary $\Gamma$ of a polygon/polyhedron and $\mathcal{T}_h$-piecwise polynomials $\psi$ of degree $p$, this inverse estimates takes the form

$$\|h_{\mathcal{T}}^{1/2} p^{-1} \nabla_\Gamma V\phi\|_{L^2(\Gamma)} \leq C\|\phi\|_{H^{-1/2}(\Gamma)}$$

Such an inverse estimate is a crucial ingredient for the convergence proof of adaptive BEM. Indeed, the work [Carstensen, Feischl, Page, Praetorius '14] identified four "axioms" that ensure rate-optimal adaptive algorithms. This inverse inverse estimate is at the heart of the proof of two of these axioms, namely, the "stability on non-refined elements" and the "reduction on refined elements".