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ON THE TRACTION PROBLEM FOR THE LAMÉ SYSTEM ON CURVILINEAR POLYGONS

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ABSTRACT. We give a complete description of the spectra of certain elastostatic and hydrostatic boundary layer potentials in L^p, $1 < p < \infty$, on bounded curvilinear polygons. In particular, our analysis shows that the spectral radii of these operators on L^p are less than one if p is large enough. This holds for the case of the boundary layer potential operator associated to the *traction* conormal derivative. Such results are important when dealing with the issue of constructively solving boundary value problems for the Lamé system of elasticity and for the Stokes system of hydrostatic in domains with isolated singularities. Our approach is based on Mellin transform techniques and Calderón-Zygmund theory.

1. Introduction. Quite often, solving a boundary value problem such as

$$\text{(BVP)} \quad \begin{cases} \mathcal{L}u = 0 & \text{in } \Omega, \\ \mathcal{B}u = f & \text{on } \partial\Omega, \end{cases} \tag{1}$$

for an elliptic operator $\mathcal{L}$ with the boundary condition $\mathcal{B}$, reduces to inverting an operator of the form "identity+K," where K is a singular integral operator, on some appropriate L^p boundary function spaces. In turn, the question of expanding the aforementioned inverse in a strongly convergent Neumann series comes down to checking whether $\rho(K; L^p)$, the spectral radius of the operator K on the L^p function space under discussion, satisfies

$$\rho(K; L^p) < 1. \tag{2}$$

We recall here that $\rho(K; L^p) := \sup\{|w|; w \in \mathbb{C} \text{ and } wI - K \text{ is not invertible on } L^p\}$, where I stands for the identity operator. This

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