

**Title:** The Poisson Problem for the Regional Logarithmic Laplacian

**Abstract:** In this work, we study the regional logarithmic Laplacian  $L_{\Delta}^{\Omega}$  in bounded Lipschitz domain  $\Omega \subset \mathbb{R}^N$ . This operator appears as an explicit derivative  $\partial_s \Big|_{s=0} (-\Delta)_{\Omega}^s$  of regional fractional Laplacian at  $s = 0$ . We develop the functional setting for the Poisson problem relating to  $L_{\Delta}^{\Omega}$  which allows us to characterize the asymptotic behavior of eigenvalues and eigenfunctions of  $(-\Delta)_{\Omega}^s$  as  $s \rightarrow 0^+$ . Moreover, we study regularity of solutions related to the Poisson problem and finally we also obtain global bounds of eigenfunctions associated to  $L_{\Delta}^{\Omega}$ .