Clifford-valued boundary methods for anisotropic vector potential problems

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Abstract. The coefficients of most anisotropic vector potential problems such as anisotropic elasticity, piezoelasticity, etc. possess the properties of major and first minor symmetries. The symmetries are taken advantage of to decompose twice the anisotropic vector potential operator into the Laplacian operator spectra, and each Laplacian operator is then factored into the Dirac (or Cauchy-Riemann) operators. The harmonic and monogenic (or holomorphic) fundamental solutions (FS) and particular solutions (PS) are synthesized in such a way reversing the earlier twice spectral decompositions and Clifford factorization as to constitute the FS and PS of the n-dimensional anisotropic vector potential equation. Using the FS, we derive Clifford-valued singular boundary integral equations (BIE) for bounded domains with corners, and propose boundary methods based upon the FS, PS, and BIE.