Hodge decompositions on general 2D manifold

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Abstract. Let Γ be a two dimensional, locally Lipschitz compact manifold in $I\!R^3$. We construct Hodge decompositions for tangential vector fields on Γ in a certain range of Sobolev regularity. When the manifold is multiconnected, we characterize the space of divergence and curl free vectors providing an algorithm for the construction of an orthogonal basis.