Some remarks about the decomposition of vector fields in domains with boundary singularities

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Abstract

Decompositions of vector fields into a solenoidal part and a gradient field, $u = u_0 + \nabla p$, play an essential role in the theory of continuum mechanics and the papers related to this problem are legion. Such decompositions are naturally constructed by solving special weak Laplace-problems for the function p. In the case of boundary singularities which may occur in various types of unbounded boundaries as well as conical points, edges etc it might be interesting to know more about the asymptotic behavior of p than the assertion $p \in L^q_{loc}$ for some q. This lecture is about some general strategies to extract such information.