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Lie algebras of vector fields and analysis of boundary value problems

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Abstract

An approach, due to Epstein, Melrose, and Mendoza to the analysis on strictly pseudoconvex domains, is based on certain Lie algebra of vector fields on the domain. This approach is useful in other settings and can indeed be generalized. I will begin by reviewing some classical results on the analysis on compact manifolds and on manifolds with conical points. It turns out that many of these classical results generalize to a larger class of singular or non-compact spaces with nice ends obtained by using suitable classes of vector fields. These vector fields model the geometry at infinity. One obtains, for instance, the well-posedness of the Dirichlet problem on general n-dimensional polyhedral domains. Another typical result is to obtain Fredholm conditions for the natural operators on singular domains and spaces.