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Boundary Value Problems for Elliptic Wedge Operators of First Order

Spaces with singularities of edge type are modeled by a smooth compact manifold with boundary, where the boundary is the total space of a locally trivial fibration. The relation with the singular space is given by collapsing the fibers to points. On such manifolds there is a natural class of incomplete Riemannian metrics (incomplete-edge metrics) that reflect the conic degeneration of the fibers at the boundary. Geometric operators associated with such metrics are examples for the broader class of wedge differential operators. In the case of the trivial boundary fibration (fiber is a point), incomplete-edge metrics are precisely the smooth metrics up to the boundary, and the class of wedge differential operators includes all regular differential operators with smooth coefficients up to the boundary.

In this talk, I will report about joint work with Gerardo Mendoza addressing the problem of well-posedness of elliptic equations for wedge operators of first order. Central to the investigation is the development of an appropriate notion of boundary condition associated with the singular locus (i.e. the edge). In the case of the trivial boundary fibration, our theory includes the classical theory of elliptic boundary problems for first-order operators as a special case.