Essential Killing fields of parabolic geometries

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Date / Time / Location: Tues. January 24, 2012, 10:00 - 11:00, JD35.

Abstract:

I will present work with A. Cap in which we found results for Killing vector fields of general parabolic geometries unifying and generalizing a theorem of Nagano and Ochiai on projective structures (1986) and a recent theorem of myself and Frances on conformal pseudo-Riemannian structures. These "strongly essential" Killing fields are nonlinearizable, and their existence seems to be rather special. An important rigidity question, affirmed by these two predecessor theorems, asks whether such Killing fields can only exist on spaces locally equivalent to the homogeneous model. I will present two examples, projective structures and almost-Grassmannian structures, for which we obtain vanishing of the curvature, and hence local equivalence to the homogeneous model, on a nonempty open set. With time, I'll discuss the possibility of a non-flat example that nonetheless admits a strongly essential Killing field.