Invariant involutive structures on Lie groups

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Involutive structures are systems of vector fields with complex coefficients satisfying Frobenius' bracket condition. Their study started as a means for understanding crucial features of certain systems of PDEs that naturally arise in some geometrical situations – notably in the field of Complex Analysis in several variables, where the usual Cauchy-Riemann operators induce such a system on real hypersurfaces in the complex space e.g. the boundary of a bounded open set, and whose properties are intimately connected with extension phenomena of holomorphic functions defined in the interior.

As such, they give rise differential complexes akin to de Rham's or Dolbeault's (but generally not elliptic), whose spaces of higher order solutions (i.e. its cohomology) encode a great deal of information of the underlying system, and are thus of interest.

Although even the local theory of involutive structures has many open questions, in this talk we take a global standpoint on this business and discuss some of these constructions on compact manifolds, but especially on compact Lie group: by requiring that our structures have many symmetries (hence we call them *invariant*, which are exactly the ones generated by complex-valued left-invariant vector fields) one can give much more precise information about the operators that figure in the differential complex and its global cohomology classes.