GRADUATE SEMINAR

Abdel Rahman Al-Abdallah

Maximal Complex Foliation of Compact Projective Orbits

PhD Student supervised by professor Bruce Gilligan

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2:30 pm
Math and Stat Lounge (CW 307.20)

Abstract:

Assume that G is a connected Lie group that admits a faithful representation into the automorphism group of a complex projective space $\mathbb{P}^n$. Let $\mathfrak{g}$ be the Lie algebra of G and let $\widehat{G}$ be the smallest connected complex Lie group in $\mathrm{PSL}_{n+1}(\mathbb{C})$ which contains G. i.e., $\widehat{G}$ corresponds to the Lie algebra $\widehat{\mathfrak{g}} := \mathfrak{g} + i\mathfrak{g}$. Assume that G has a compact orbit $\Sigma := G \cdot x_0 \hookrightarrow \widehat{G} \cdot x_0 \hookrightarrow \mathbb{P}^n$.

Let $T_x\Sigma$ be the tangent space of Σ at $x \in \Sigma$ and let W_x be the maximal complex tangent space of Σ at x. i.e., $W_x := T_x\Sigma \cap iT_x\Sigma$.

We assume that W_x has a constant dimension, and the subbundle $W := \sqcup W_x$ is integrable.Thus, by Frobenius theorem Σ is foliated by maximal connected complex submanifolds, called the leaves of the foliation, whose tangent bundle is W.

The purpose of this talk is to outline a proof of our result that the leaves are flag manifolds and to describe the structure of Σ and the complex orbit $\widehat{G} \cdot x_0$ with special attention to the setting where the (real) codimension of W_x in $T_x(\Sigma)$ is less than or equal two. Our methods include results from Lie theory and complex analysis.

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