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Compact CR-solvmanifolds as Kaehler obstructions

Let G be a connected, simply connected, complex, solvable Lie group, G_0 a closed subgroup of G and Γ a discrete subgroup of G_0 such that G_0/Γ is compact. We characterize when G_0/Γ admits a CR-embedding into a Kähler manifold in terms of conditions on the Lie algebra $\mathfrak{g}_0$ of G_0. For G nilpotent it was known that this is equivalent to the existence of a Lie algebra splitting $\mathfrak{g}_0 = \mathfrak{a}_0 \oplus \mathfrak{m}$, where the maximal complex ideal $\mathfrak{m} := \mathfrak{g}_0 \cap i\mathfrak{g}_0$ is abelian and $\mathfrak{a}_0 \cap i\mathfrak{a}_0 = 0$. For G solvable things are more complicated. We use the fibration $G/\Gamma \to G/N \cdot \Gamma$ and its restriction to G_0/Γ to analyze the situation, where N denotes the nilradical of G. The essential condition is on the adjoint representation of $\mathfrak{g}_0$ on $\mathfrak{m}$; it must have purely imaginary spectrum and be diagonalizable. Examples will be presented that illustrate the theory.

This is joint work with Prof. Karl Oeljeklaus, l'Université de Provence, Marseille, France.