

SEMINARIO DI GEOMETRIA

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Bergman–Hartogs domains, Cartan–Hartogs domains, and their automorphisms

Let Ω be a bounded complex domain, with Bergman kernel $\mathcal{K}(z)$. For $c > 0$ real and $N > 0$ integer, the *Bergman–Hartogs domain* $\widehat{\Omega}(c, N)$ is defined as

$$\widehat{\Omega}(c, N) := \{(z, Z) \in \Omega \times \mathbb{C}^N \mid \|Z\|^2 < \mathcal{K}_\Omega(z)^{-c}\}.$$

When Ω is *homogeneous*, the domains $\widehat{\Omega}(c, N)$ provide a large class of bounded complex domains which are in general non-homogeneous, but have a one parameter family of orbits. The exact automorphism group can then be described.

When Ω is *bounded and symmetric*, $\widehat{\Omega}(c, N)$ is called a *Cartan–Hartogs domain* (generalizing Thullen domains). We will review recent results on Cartan–Hartogs domains: Bergman kernel, Lu Qikeng problem, Kähler–Einstein metric.

Most of these questions are open for Bergman–Hartogs domains when the basis Ω is homogeneous, non symmetric.