Reseach Plan

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In my previous research, we considered the Hartogs domain whose base domain Ω satisfies the following condition:

Condition. *Let p be a positive continuous function on Ω and $s > 0$. The weighted Bergman kernel K_{Ω,p^s} is expressed as*

$$K_{\Omega,p^s}(z,z') = \chi(s)F(z,z')^{-s}G(z,z') \quad \textit{for all } (z,z') \in \Omega \times \Omega, \qquad (1)$$

where χ is a polynomial in s and F and G are functions on $\Omega \times \Omega$. Further the functions F, p satisfy $p(z) = F(z,z)$ and $|F(z,z')|^2 \geq F(z,z)F(z',z')$ for all $z, z' \in \Omega$.

We already know that if Ω is $\mathbb{C}^n$ or a irreducible bounded symmetric domain then the pair (Ω, p) satisfies Condition 2.1 for a certain p.

• It would be interesting to find other concrete examples which satisfy Condition.

In my previous work, we used the Forelli-Rudin construction(Ligocka, 1989) to obtain an explicit formula of the Hartogs domain. There are some generalizations of the Forelli-Rudin construction (M. Englis, G. Zhang).

• It would be interesting to generalize my previous works by using these generalizations.

There are many works for the Cartan-Hartogs domains:

1. The comparison theorem for the Bergman and the Kobayashi metrics on the Cartan-Hartogs domain (by X.Zhao, D.Li, W.Yin).

2. The Kähler-Einstein metric on the Cartan-Hartogs domain (by A.Wang, M.Wang, L.Zhang).

3. Balanced metrics on the Cartan-Hartogs domains (by A.Loi, M.Zedda).

• It would be interesting to generalize these works for the Hartogs domain with Condition.