Reseach Plan

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In my previous research, I considered the Hartogs domain under 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*

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

where χ *is a polynomial in* s, F, G *are functions on* $\Omega \times \Omega$ *and 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 for a certain p. However I do not know any other examples.

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

In my previous work, I used the Forelli-Rudin construction(Ligocka, 1989) to obtain an explicit formula of the Hartogs domain. It is known that there are some generalizations of the Forelli-Rudin construction (M. Englis, G. Zhang). And recenty, I found another direction of generalization.

• 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 (A.Wang, M.Wang, L.Zhang).
3. The Balanced metric on the Cartan-Hartogs domain (A.Loi, M.Zedda).

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