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Intersection of Poletsky-Stessin Hardy Spaces on Polydisk. Preliminary report.

Let u be a continuous negative plurisubharmonic exhaustion function on $\mathbb{D}^n$ with finite Monge-Ampère mass. The Poletsky–Stessin Hardy space $H_u^p(\mathbb{D}^n)$ consists of all holomorphic functions on $\mathbb{D}^n$ satisfying the growth condition

$$\varlimsup_{r\to 0^-} \int_{S_{u,r}} |f|^p \, d\mu_{u,r} < \infty$$

It is known that these spaces are contained in the classical Hardy space $H^p(\mathbb{D}^n)$ and if the exhaustion u is such that $(dd^c u)^n$ is compactly supported then $H_u^p(\mathbb{D}^n) = H^p(\mathbb{D}^n)$. But in general these spaces are different. For instance if u and v are two exhaustions such that $u \le v$ near the boundary $\partial\mathbb{D}^n$ then $H_u^p(\mathbb{D}^n) \subset H_v^p(\mathbb{D}^n)$. So for the different exhaustions chances are that we get different Poletsky–Stessin Hardy spaces. In fact, there are abundance of Poletsky–Stessin Hardy spaces on $\mathbb{D}^n$. In this presentation I will talk about the intersection of Poletsky–Stessin Hardy spaces on $\mathbb{D}^n$ over all exhaustion functions. (Received September 15, 2014)