Composition operators on the polydisc

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Let $\mathcal{U}$ be a domain in $\mathbb{C}^d$, let X be a Banach space of holomorphic functions on $\mathcal{U}$ and let $\phi : \mathcal{U} \to \mathcal{U}$ be holomorphic. The composition operator with symbol ϕ is defined by $C_\phi(f) = f \circ \phi$, $f \in X$. The first question to solve is about the continuity of the operator. When X is the Hardy space or a weighted Bergman space of the unit disc it is easy : by the Littlewood principle it is always the case. However, as the dimension grows, the problem gets trickier and first order conditions are not enough to characterize continuity. In this talk, I will present a general characterization of continuity which is local around the contact points and which, under a natural non-degeneracy assumption, only involves the behaviour of the symbol on the polytorus and a class of symbols that are bounded only on some Bergman spaces as well as some consequences of these results.

References

[1] Kosiński, L. Composition operators on the polydisc *J. Funct. Anal.*, 284:109801, 2023