1003-30-798  

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In this paper, we investigate compact composition operators which are not Hilbert–Schmidt. We consider the class of examples (B.A.Lotto,1998) of composition operators $C_\phi$ whose symbol $\phi$ are Riemann maps from the unit disk $D$ onto the semi–disk with center $(1/2,0)$, radius $1/2$ and, in general,onto a ”crescent” shaped regions constructed based on this semi–disk.

We use the R.Riedel(1994) characterization of β–boundedness/compactness on $H^2$ to determine the range of values of $\beta \in \mathbb{R}$ for which $C_\phi$ is $\beta$–bounded/compact.Similar results also extend to composition operators acting on the weighted Bergmann spaces $A^2_\alpha$ ( $\alpha > -1$) based on W.Smith’s(1996) characterization of $\beta$–boundedness/compactness on these spaces. In particular, as our first result, we show that the class of Riemann maps under consideration gives example(s) of $\beta$–bounded composition operators $C_\phi$ which fails to be $\beta$ compact($0 < \beta < \infty$).This was an open question in Hunziker and Jarchaw(1991). Our second result arises from our attempt to generalize these observations to relate Hilbert–Schmidt Class with $\beta$–bounded/compact operators. We prove a neccessary condition for $C_\phi$ to be Hilbert–Schmidt. (Received September 29, 2004)