962-47-501

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The Role of the Spectrum in the Cyclic Behavior of Composition Operators.

A bounded linear operator T on a Hilbert space $\mathcal{H}$ is said to be cyclic if there is a vector $x \in \mathcal{H}$ such that the linear span of the orbit $\{T^n x : n \geq 0\}$ is dense in $\mathcal{H}$. If the orbit itself is dense, then T is called hypercyclic. We completely characterize the cyclicity and the hypercyclicity of composition operators, whose symbols are linear fractional maps, acting on weighted Dirichlet spaces. Particular instances of these spaces are the Bergman space, the Hardy space and the Dirichlet space. Thus, we complete earlier work on cyclicity on these spaces. In this way, we find exactly the spaces in which these composition operators fail to be cyclic or hypercyclic. We will find that the Dirichlet space plays a critical role in the cut-off. (Received September 15, 2000)