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Hypercyclicity of composition operators with analytic symbols in $O(D)$: One variable case

Let Ω be a domain. We will denote by $O(\Omega)$ the spaces of analytic functions on Ω endowed with the topology of uniform convergence on compact subsets of Ω. An analytic function φ from Ω into itself gives rise to an operator C_φ on $O(\Omega)$ via $C_\varphi(f) \doteq f \circ \varphi$. This operator, which is usually referred to as the *composition operator with symbol* φ, defines a continuous linear operator from the Frechét space $O(\Omega)$ into itself. Recall that one calls C_φ *hypercyclic* in case there exits an analytic function f such that the orbit $\left\{C_{\varphi^{[n]}}(f)\right\}_n$ is dense in $O(\Omega)$, where as usual $\varphi^{[n]}$ is the n'th iterate of φ, $n = 1.2....$ Given the theme of the main lecture, it is natural to wonder as to whether one can characterize hypercyclic composition operators in terms of their symbols. It turns out that a satisfactory theory around this question exists for domains in the complex plane. This will be the theme of my expository lecture. Following Grosse-Erdmann and Mortini (JOURNAL D'ANALYSE MATHÉMATIQUE vol 107, 2009) I will give the results of this theory and try to explain the main ideas of their proofs.