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Asymptotic behaviour of powers of composition operators

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We study the asymptotic behaviour of the powers T^n of a continuous composition operator T on an arbitrary Banach space X of holomorphic functions on the open unit disc of the complex plane. We show that for composition operators, one has the following dichotomy: either the powers converge uniformly or they do not converge even strongly. We also show that uniform convergence of the powers of an operator $T \in L(X)$ is very much related to the behaviour of the poles of the resolvent of T on the unit circle and that all poles of the resolvent of the composition operator T on X are algebraically simple. Our results are applied to study the asymptotic behaviour of semigroups of composition operators associated with holomorphic semiflows.

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