# Operators that are not orbit-reflexive

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(Joint work with Vladimír Müller)

Let $T$ be a bounded linear operator on a (real, complex) Banach space $X$. Analogously to the definition of reflexivity, we say that $T$ is orbit-reflexive if every bounded linear operator $A$ belongs to the closure of $\{T^n : n = 1, 2, 3 \dots\}$ in the strong operator topology whenever $Au \in \overline{\{T^n u : n = 1, 2, 3 \dots\}}$ for each $u \in X$. While the notion of reflexivity is connected to the problem of invariant subspaces, orbit-reflexivity is in the same way connected to the problem of invariant subsets.

Recently, Sophie Grivaux and Maria Roginskaya found a Hilbert space operator which is not orbit-reflexive. We present a different, more simple type of construction that also provides a Hilbert space operator which is not orbit-reflexive, and moreover a Banach space operator which is reflexive but not orbit-reflexive.