Orbits of operators and operator semigroups

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Let T be a bounded linear operator acting on a Banach space X. Typically the behaviour of the orbit $\{T^n x : n = 0, 1, \dots\}$ depends essentially on the choice of the initial vector $x \in X$.

The existence of very irregular orbits has been studied intensely in the theory of hypercyclic and supercyclic vectors.

The lecture will be a survey of results concerning the existence of very regular orbits, for example orbits satisfying $\|T^n x\| \to \infty$, or orbits with $\|T^n x\|$ "large" for all n.

Similar questions can also be studies for weak orbits $\langle T^n x, x^* \rangle$, where $x \in X, x^* \in X^*$.

We will also discuss analogous questions for strongly continuous semigroups $(T(t))_{t \geq 0}$ of operators.