Almost weak convergence of operator semigroups

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We discuss connections between spectral properties of the generator of a relatively weakly compact C_0-semigroup on a Banach space and convergence of the semigroup as $t \to \infty$ (in particular for the weak operator topology).

Note that by the classical Jacobs–Glicksberg–de Leeuw decomposition it suffices to study convergence to 0 (stability). We discuss a result showing that the property "no eigenvalues of the generator on the imaginary axis" is equivalent to weak stability for a large set of time values (so called "almost weak stability"). However, this stability property is still far from weak stability. Indeed, we present category theorems for weakly and almost weakly stable semigroups on separable Hilbert spaces to show that these sets have different category in Baire sense.

References:

1) T. Eisner, B. Farkas, R. Nagel, and A. Serény, *Almost weak stability of C_0-semigroups on Banach spaces*, submitted.

2) T. Eisner, A. Serény, *Category theorems for weakly and almost weakly stable semigroups*, preprint.