Colloquium

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The Ritt property for contraction operators and square functions in L^1

Friday, November 4, 2022
3:00 p.m. in BB-B012
(tea & coffee at 2:45 p.m.)

ABSTRACT. The problem of convergence and rate of convergence of powers of contraction operators T^n has fascinated mathematicians. In recent years, advancements for operators satisfying the following Ritt condition:

$$\sup_n n\|T^n - T^{n+1}\| < \infty,$$

were obtained using a Cauchy integral representation for operators for functions in L^p, for $1 < p < \infty$. We will present the history of the problem, with spectral requirements for pointwise convergence and the boundedness of a square functions such as $\sum_n n|T^n f - T^{n+1} f|^2$. Unfortunately, the methods did not extend to L^1. However, positive results are obtained for the following particular case: let μ be a probability measure in the integers, and $\tau : X \to X$ a measure preserving transformation. Define

$$T_\mu(f)(x) = \sum_{k=-\infty}^{\infty} \mu(k) f(\tau^k x).$$

We'll discuss necessary condition on the measure μ that yield the Ritt property and convergence of certain squares functions in L^1.