Department of Mathematics, BGU

Probability and ergodic theory (PET)

On *Tuesday, December ,22 2015*

At *10:50 – 12:00*

In *Math 101-*

Guy Cohen (BGU)

will talk about

REMARKS ON RATES OF CONVERGENCE OF POWERS OF CONTRACTIONS

Abstract: We prove that fi the numerical range of a Hilbert space contraction T is in a certain closed convex set of the unit disk which touches the unit circle only at ,1 then $|T^n(I-T)| =\mathcal O(1/n^{\beta})$ with $\beta \in [\frac{1}{2}, .$(1 For normal contractions the condition is also necessary. Another sufficient condition for $\beta=\frac{1}{2}$, necessary for T normal, is that the numerical range of T be in a disk ${z: |z-\delta| \le 1-\delta}$ for some $\delta \in .$(0,1) As a consequence of results of Sefiert, we obtain that a power-bounded T on a Hilbert space satisfies $|T^n(I-T)| = \mathcal O(1/n^{\beta})$ with $\beta \in $[0,1) fi and only fi $\sup_{1<|\lambda| {2> |\lambda -1|^{1/\beta} |R(\lambda,T)|< \infty$. When T is a contraction on L_2 satisfying the numerical range condition, it is shown that $T^nf /n^{1-\beta}$ converges to 0 a.e. with a maximal inequality, for every $f \in L_2$. An example shows that in general a positive contraction T on L_2 may have an $f \ge 0$ with $\limsup T^nf/\log n \sqrt{n} =\infty$ a.e.