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Mean ergodic theorems and domains of higher degree functions of Cesàro bounded operators

In this talk I will present mean ergodic results for Cesàro bounded operators T on Banach spaces X, improving some of them existing for power bounded operators. In particular, we prove that for power bounded operators, T is (C, β)-ergodic for some $\beta > 0$ if and only if $X = \mathrm{Ker}(I - T) \oplus \overline{\mathrm{Ran}(I - T)}$, where (C, β)-ergodicity implies the classical mean ergocicity for $0 < \beta < 1$. The relations between the rates of convergence in mean ergodic results and the solutions to equations $(I - T)^s x = y$, $s \in (0, 1]$, lead to discuss the domains of certain class of functions of Cesàro bounded operators T, in particular, the domain of $(I - T)^{-s}$, $s \in (0, 1)$, and the domain of $\log(I - T)$ (infinitesimal generator of the holomorphic semigroup $((I - T)^s)_{\Re s > 0}$). To prove the cited results, we use functional calculus on fractional Wiener algebras induced by this class of operators, and properties of regularity of holomorphic functions on the unit disc.

This is joint work with José E. Galé and Carlos Lizama.