



College of Science and Mathematics
Department of Mathematics

SPRING 2015 MATHEMATICS RESEARCH SEMINAR

***On the Mean Ergodicity of Bounded Weak Solutions
of an Abstract Evolution Equation - Part 1***

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One of the primary questions of the *qualitative theory* of differential equations is that of behavior of solutions at infinity.

For the abstract evolution equation

$$y'(t) = Ay(t), \quad t \geq 0,$$

with a densely defined closed linear operator A in a complex Banach space X , we are to find conditions formulated exclusively in terms of the space or/and the operator and sufficient for the *Cesàro means*

$$\frac{1}{t} \int_0^t y(s) ds$$

of every bounded weak solution $y(\cdot)$ of the equation to converge at ∞ .

In Part 1, we shall consider the cases of a *finite-dimensional* space, an operator with a bounded inverse, and a *reducibly invertible* operator; in Part 2 — the cases of a *reflexive* space and a *scalar type spectral operator*, in particular, a *normal operator*, in a complex Hilbert space.