1065-47-182 **Nathan S Feldman*** (feldmanN@wlu.edu), Mathematics Department, Washington & Lee University, Lexington, VA 24450. *n-Weakly Hypercyclic Operators.*

An operator T on a separable Hilbert space H is said to be hypercyclic if there is a vector x in H whose orbit, $\{T^n x : n \geq 0\}$, is dense in H. Similarly, an operator T is called supercyclic if there is a vector x whose scaled orbit under T, $\{cT^n x : n \geq 0, c \in \mathbb{C}\}$, is dense in H. If an operator T has a vector whose orbit is weakly dense in H (or a scaled orbit that is weakly dense in H), then we say that the operator is weakly hypercyclic (or weakly supercyclic).

In this talk we will introduce weaker forms of weak hypercyclicity and weak supercyclicity. For an integer $n \geq 1$ and a set $E \subseteq H$, we define E to be n-weakly dense in H if E has a dense orthogonal projection onto every n-dimensional subspace of H. One can easily check that a set E in H is weakly dense in H if and only if E is n-weakly dense in H for every $n \geq 1$. We then define an operator T to be n-weakly hypercyclic (resp. n-weakly supercylcic) if there is a vector x in H whose orbit (resp. scaled orbit) is n-weakly dense in H.

We will discuss some examples of such operators and surprisingly there are matrices with some of these properties. (Received September 13, 2010)