Hypercyclic operators on non-unital C*-algebras

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The dynamics of wedge operators on the (non-commutative) C^*-algebra of compact operators on a Hilbert space has been considered in for instance [2], whereas the dynamics of the weighted composition operators on the (commutative) C^*-algebra of continuous functions has been considered in for instance [1]. In this talk we present an algebraic generalization of these results to the case of arbitrary non-unital C^*-algebras. More precisely, we let $\mathcal{A}$ be a non-unital C^*-algebra such that $\mathcal{A}$ is a closed two-sided ideal in a unital C^*-algebra $\mathcal{A}_1$ and we let Φ be an isometric $*$-isomorphism of $\mathcal{A}_1$ such that $\Phi(\mathcal{A}) = \mathcal{A}$. For an invertible element $b \in \mathcal{A}_1$ we let $T_{\Phi,b}$ be the operator on $\mathcal{A}_1$ defined by $T_{\Phi,b}(a) = b \cdot \Phi(a)$ for all $a \in \mathcal{A}_1$. Then $T_{\Phi,b}$ is a bounded linear operator on $\mathcal{A}_1$ and since $\mathcal{A}$ is an ideal in $\mathcal{A}_1$, it follows that $T_{\Phi,b}(\mathcal{A}) \subseteq \mathcal{A}$ because $\Phi(\mathcal{A}) = \mathcal{A}$.

We study the dynamics of the operator $T_{\Phi,b}$ and we provide the necessary and sufficient conditions for a finite family of such operators to be disjoint hypercyclic on $\mathcal{A}$. Moreover, we illustrate our result in the various cases of some concrete non-unital C^*-algebras.

In addition, we study the dynamics of the generalized weighted bilateral shift operators on the standard Hilbert C^*-module, and we provide concrete examples. This talk is partly based on [3, 4].

References

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