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# On the Pseudospectra of $q$-Quasinormal Operators

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**Abstract**

This study investigates the $\varepsilon$-pseudospectra of bounded $q$-quasinormal operators acting on separable Hilbert spaces, where $q > 1$. By using the structural representation of such operators as weighted shift-type tensor product operators, several geometric properties of their pseudospectra are obtained.

It is also shown that, as $q \to \infty$, the pseudospectra of these operators approach the pseudospectrum of a rank-one nilpotent operator. This shows that the limiting behavior is determined mainly by the nonnormal structure of the operator rather than by its spectrum.

**Keywords:** $q$-quasinormal operator, pseudospectrum.

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