

Berezin transform and compactness of Toeplitz operators on the harmonic Bergman space

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For an operator which is a finite sum of products of finitely many Toeplitz operators on the harmonic Bergman space over the half-space, we study the problem: *Does the boundary vanishing property of the Berezin transform imply compactness?* This is motivated by the Axler-Zheng theorem for analytic Bergman spaces, but the answer would not be yes in general, because the Berezin transform annihilates the commutator of any pair of Toeplitz operators. Nevertheless we show that the answer is yes for certain subclasses of operators. We first find a sufficient condition on general operators and use it to reduce the problem to whether the Berezin transform is one to one on the subclass of operators under consideration. Then we obtain positive results for three subclasses. We also announce some open problems naturally raised by this work.

This talk is based on a joint work with K. Nam.