

TOEPLITZ AND HANKEL OPERATORS ON WEIGHTED BERGMAN SPACES*

Namita Das [†] Swarupa Roy[‡]

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Dedicated to Dr. Vasile Drăgan on the occasion of his 70th anniversary

Abstract

In this paper we have shown that if $S \in \mathcal{L}(L_a^2(dA_\alpha))$ and $\Theta_S^{(\alpha)}(x, \bar{y})\Theta_T^{(\alpha)}(x, \bar{y})(K^{(\alpha)}(x, \bar{y}))^2 \approx \Theta_{ST}^{(\alpha)}(x, \bar{y})(K^{(\alpha)}(x, \bar{y}))^2$ for all $x, y \in \mathbb{D}$ and for all $T \in \mathcal{L}(L_a^2(dA_\alpha))$, then $S = T_\phi^{(\alpha)}$ for some $\phi \in H^\infty(\mathbb{D})$ and the matrix of S is lower triangular, where $\Theta_S^{(\alpha)}(x, \bar{y})$ for $S \in \mathcal{L}(L_a^2(dA_\alpha))$ is a function on $\mathbb{D} \times \mathbb{D}$ meromorphic in x and conjugate meromorphic in y . Further, we show that if $\psi, \phi \in L^\infty(\mathbb{D})$, $R^{(\alpha)} \in \mathcal{L}(L_a^2(dA_\alpha))$, then $\Theta_{T_\phi^{(\alpha)}}^{(\alpha)}(x, \bar{y})\Theta_{S_\psi^{(\alpha)}}^{(\alpha)}(x, \bar{y})(K^{(\alpha)}(x, \bar{y}))^2 \approx \Theta_{R^{(\alpha)}}^{(\alpha)}(x, \bar{y}) \cdot (K^{(\alpha)}(x, \bar{y}))^2$ holds for all $x, y \in \mathbb{D}$ if and only if there exists $\beta \in \mathbb{C}$ such that $\phi \equiv \beta$ and $R^{(\alpha)} = S_{\beta\psi}^{(\alpha)}$.

MSC: 47B38, 47B32

keywords: Weighted Bergman spaces, reproducing kernel, Toeplitz operator, little Hankel operator, Berezin transform.

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[†] namitadas440@yahoo.co.in, P.G. Dept. of Mathematics, Utkal University, Vani Vihar, Bhubaneswar- 751004, Odisha, India

[‡] swarupa.roy@gmail.com, P.G. Dept. of Mathematics, Utkal University, Vani Vihar, Bhubaneswar- 751004, Odisha, India.