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Restrictions of Certain Degenerate Principal Series of the Universal Covering of the Symplectic Group

Let $\widetilde{Sp}(n, \mathbb{R})$ be the universal covering of the symplectic group. In this paper, we study the restrictions of the degenerate unitary principal series $I(\epsilon, t)$ of $\widetilde{Sp}(n, \mathbb{R})$ onto $\widetilde{Sp}(p, \mathbb{R})\widetilde{Sp}(n - p, \mathbb{R})$. We prove that if $n \geq 2p$, $I(\epsilon, t)|_{\widetilde{Sp}(p,\mathbb{R})\widetilde{Sp}(n-p,\mathbb{R})}$ is unitarily equivalent to an L^2-space of sections of a homogeneous line bundle $L^2(\tilde{S}p(n - p, \mathbb{R}) \times_{\widetilde{GL}(n-2p)N} \mathbb{C}_{\epsilon, t+\rho})$ (see Theorem 1.1). We further study the restriction of complementary series $C(\epsilon, t)$ onto $\tilde{U}(n-p)\widetilde{Sp}(p, \mathbb{R})$. We prove that this restriction is unitarily equivalent to $I(\epsilon, t)|_{\tilde{U}(n-p)\widetilde{Sp}(p,\mathbb{R})}$ for $t \in i\mathbb{R}$. Our results suggest that the direct integral decomposition of $C(\epsilon, t)|_{\widetilde{Sp}(p,\mathbb{R})\widetilde{Sp}(n-p,\mathbb{R})}$ will produce certain complementary series for $\widetilde{Sp}(n - p, \mathbb{R})$ (H. He, Certain Induced Complementary Series of the Universal Covering of the Symplectic Group, submitted 2009).

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