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Convolution of Orbital Measures on Complex Grassmannians

In recent papers by B. Anchouche, S. K. Gupta, and A. Plagne [*Orbital measures on $SU(2)/SO(2)$*, Monatshefte Math. 178 (2015) 493–520] and B. Anchouche, and S. K. Gupta [*Smoothness of the Radon-Nikodym derivative of a convolution of orbital measures on compact symmetric spaces of rank one*, Asian J. Math., to appear], the regularity of the Radon-Nikodym derivative of the convolutions of orbital measures on a compact symmetric space of rank one was studied. The aim of this paper is to extend the results obtained in the second paper to the case of complex Grassmannians. More precisely, let $M = U/K$, where $U = SU(p + q)$ and $K = S(U(p) \times U(q))$, be the complex Grassmannian of a p-plane in $\mathbb{C}^{p+q}$, $p \geq q \geq 2$, $a_1, ..., a_r$ be r points in U, and consider the convolution product $\nu_{a_1} * ... * \nu_{a_r}$ of the orbital measures $\nu_{a_1}, ..., \nu_{a_r}$ supported on $Ka_1K, ..., Ka_rK$. By a result of D. Ragozin [*Zonal measure algebras on isotropy irreducible homogeneous spaces*, J. Func. Anal. 17(4) (1974) 355–376], if $r \geq \dim M$, then $\nu_{a_1} * ... * \nu_{a_r}$ is absolutely continuous with respect to the Haar measure of U. The aim of this paper is to investigate the C^k−regularity of the Radon-Nikodym derivative of $\nu_{a_1} * ... * \nu_{a_r}$ with respect to the Haar measure of U.

Keywords: Convolution of orbital measures, Grassmannians, spherical functions, Radon-Nikodym derivative.

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