

MATRIX VALUED p -CONVOLUTION OPERATORS

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Abstract. Let G be a locally compact group equipped with the left (or right) Haar measure m_G , M_n be an $n \times n$ matrix with entries in \mathbb{C} and let $M(G, M_n)$ be the Banach algebra consists all M_n -valued measures on G . We define left and right p -convolution operators on $L^p(G, M_n)$, where $1 < p < \infty$ and investigate some properties of these operators. For a locally compact abelian group G , we consider the Fourier transforms of M_n -valued functions and measures and show that there is an isometric $*$ -homomorphism ($*$ -anti-homomorphism) from $L^\infty(\hat{G}, M_n)$ onto the space of all p -convolution operators.

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REFERENCES

- [1] C.-H. CHU, *Matrix-valued harmonic functions on groups*, J. reine angew. Math., 552(2002), 15–52.
- [2] C.-H. CHU, *Matrix convolution operators on groups*, Lecture Notes in Mathematics, Springer-Verlag Berlin Heidelberg, 2008.
- [3] C.-H. CHU AND A. T.-M. LAU, *Jordan structures in harmonic functions and Fourier algebras on homogeneous spaces*, Math. Ann., 336(2006), 803–840.
- [4] A. DERIGHETTI, *Convolution operators on groups*, Lecture Notes of the Union Mathematica Italiana, Springer, 2011.
- [5] J. DIESTEL AND J. J. UHL, *Vector measures*, Math. Surv. 15, Amer. Math. Soc., 1977.
- [6] L. HÖRMANDER, *Estimates for translation invariant operators in L^p spaces*, Acta Math., 104(1-2)(1960), 93–140.
- [7] M. TAKESAKI, *Theory of operator algebras I*, Springer-Verlag, New York Inc., 1979.