

OPERATOR-VALUED MAPS ON HILBERT C^* -MODULES

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Abstract. We provide a characterization for operator-valued completely bounded linear maps on Hilbert C^* -modules in terms of φ -maps. Also, we show that for every operator-valued completely positive map φ on a C^* -algebra \mathcal{A} , there is a unique (up to multiplication by a unitary operator) non-degenerate φ -map on each Hilbert \mathcal{A} -module.

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REFERENCES

- [1] L. ARAMBAŠIĆ, *Irreducible representations of Hilbert C^* -modules*, Math. Proc. R. Ir. Acad. **2** (2005), 11–24.
- [2] N. ARONSZAJN, *Theory of Reproducing Kernels*, Tran. Amer. Math. Soc. **68** (3) (1950), 337–404.
- [3] M. B. ASADI, *Stinespring's theorem for Hilbert C^* -modules*, J. Operator Theory **62** (2) (2008), 235–238.
- [4] M. B. ASADI, R. BEHMANI, A. R. MEDGHALCHI, H. NIKPEY, *Completely semi- φ -maps*, arXiv:1608.00188.
- [5] B. V. R. BHAT, G. RAMESH AND K. SUMESH, *Stinespring's theorem for maps on Hilbert C^* -modules*, J. Operator Theory **68** (2012), 173–178.
- [6] S. DEY AND H. TRIVEDI, *\mathfrak{K} -families and CPD- H -extendable families*, arXiv:1409.3655v1.
- [7] D. GOSWAMI AND K. B. SINHA, *Quantum Stochastic Processes and Noncommutative Geometry*, Camb. Tra. Math., vol **169**, Camb. Uni. Press, 2007.
- [8] A. N. KOLMOGOROV, *Stationary sequences in Hilbert space*, Bull. Math. Univ. Moscow **2** (1941), 1–40.
- [9] J. HEO AND UN C. JI, *Quantum stochastic processes for maps on Hilbert C^* -modules*, J. Math. Phys. **52** (2011), 053501.
- [10] E. C. LANCE, *Hilbert C^* -modules*, Lond. Math. Soc. Lec. Note Ser., vol. **210**, Camb. Uni. Press, 1995.
- [11] M. JOITA, *Covariant version of the Stinespring type theorem for Hilbert C^* -modules*, Cent. Eur. J. Math. **9** (4) (2011), 803–813.
- [12] M. JOITA, *Comparison of completely positive maps on Hilbert C^* -modules*, J. Math. Anal. Appl. **393** (2012), 644–650.
- [13] W. L. PASCHKE, *Inner Product Modules Over B^* -Algebras*, Tran. Amer. Math. Soc. **182** (1973), 443–468.
- [14] V. PAULSEN, *An Introduction to the theory of Reproducing Kernel Hilbert Spaces*, www.math.uh.edu/vern, 2009.
- [15] V. PAULSEN, *Completely Bounded Maps and Operator Algebras*, Camb. Stud. adva. Math., vol. **78**, Camb. Uni. Press, 2002.
- [16] M. SKEIDE, *Factorization of maps between Hilbert C^* -modules*, J. Operator Theory **68** (2012), 543–547.
- [17] M. SKEIDE, K. SUMESH, *CP- H -Extendable maps between Hilbert Modules and CPH-semigroups*, J. Math. Anal. Appl. **414** (2014), 886–913.
- [18] W. F. STINESPRING, *Positive functions on C^* -algebras*, Proc. Amer. Math. Soc. **6** (1955), 211–216.