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## $\mathfrak{K}$ -families and CPD-H-extendable families

### Abstract

We introduce, for any set  $S$ , the concept of  $\mathfrak{K}$ -family between two Hilbert  $C^*$ -modules over two  $C^*$ -algebras, for a given completely positive definite (CPD-) kernel  $\mathfrak{K}$  over  $S$  between those  $C^*$ -algebras and obtain a factorization theorem for such  $\mathfrak{K}$ -families. If  $\mathfrak{K}$  is a CPD-kernel and  $E$  is a full Hilbert  $C^*$ -module, then any  $\mathfrak{K}$ -family which is covariant with respect to a dynamical system  $(G, \eta, E)$  on  $E$ , extends to a  $\mathfrak{K}$ -family on the crossed product  $E \times_{\eta} G$ , where  $\tilde{\mathfrak{K}}$  is a CPD-kernel. Several characterisations of  $\mathfrak{K}$ -families, under the assumption that  $E$  is full, are obtained and covariant versions of these results are also given. One of these characterizations says that such  $\mathfrak{K}$ -families extend as CPD-kernels, between associated (extended) linking algebras, whose  $(2, 2)$ -corner is a homomorphism and vice versa. We discuss a dilation theory of CPD-kernels in relation to  $\mathfrak{K}$ -families.

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Special Session: State space methods in operator and function theory. Organized by J. Ball and S. ter Horst.