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Linear transforms supporting circular convolution over a commutative ring with identity

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Abstract: We consider a commutative ring R with identity and a positive integer N. We characterize all the 3-tuples (L_1, L_2, L_3) of linear transforms over R^N, having the "circular convolution" property, i.e. such that $x * y = L_3(L_1(x) \otimes L_2(y))$ for all $x, y \in R^N$.

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