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On polynomial n -tuples of commuting isometries

Abstract

We extend some of the results of Agler, Knese, and McCarthy concerning pairs of commuting shifts to the case of n -tuples of commuting isometries, where $n > 2$. Let $V = (V_1, \dots, V_n)$ be an n -tuple of commuting isometries on a Hilbert space and let $\text{Ann}(V)$ denote the set of all n -variable polynomials p such that $p(V) = 0$. When $\text{Ann}(V)$ defines an affine algebraic variety of dimension 1 and V is completely non-unitary, we show that V decomposes as a direct of n -tuples (W_1, \dots, W_n) with the property that, for each i , W_i is either a shift or a scalar multiple of the identity. If V is a cyclic n -tuple of commuting shifts, then we show that V is determined by $\text{Ann}(V)$ up to near unitary equivalence.

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