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Orthogonal tensor decomposition from an algebraic perspective.

While every matrix admits a singular value decomposition, in which the terms are pairwise orthogonal in a strong sense, higher-order tensors typically do not admit such an orthogonal decomposition. We give an algebro-geometric analysis of the set of orthogonally decomposable tensors. More specifically, we prove that they form a real-algebraic variety defined by polynomials of degree two. A key feature of our approach is a surprising connection between orthogonally decomposable tensors and associative semisimple algebras. (Received August 30, 2016)