Multilinear Hyperquiver Representations

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We count singular vector tuples of a system of tensors. We do so by studying the generalisation of quivers to directed hypergraphs. Assigning vector spaces to its nodes and multilinear maps to the its hyperedges gives a hyperquiver representation. Hyperquiver representations generalise quiver representations (where all hyperedges are edges) and tensors (where there is only one multilinear map). The singular vectors of a hyperquiver representation are a compatible assignment of vectors to the nodes. We compute the dimension and degree of the the variety of singular vectors of a hyperquiver representation. Our formula specialises to the result of Friedland and Ottaviani to count the singular vector tuples of a generic tensor, as well as to the formula of Cartwright and Sturmfels to count the eigenvectors of a generic tensor.

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