

A hyperdeterminant for $2 \times 2 \times 3$ arrays

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We use the representation theory of Lie algebras and computational linear algebra to determine the simplest nonconstant invariant polynomial in the entries of a general $2 \times 2 \times 3$ array. This polynomial is homogeneous of degree 6 and has 66 terms with coefficients 1, -1, 2, -2 in the 12 indeterminates x_{ijk} where $i, j = 1, 2$ and $k = 1, 2, 3$. This invariant can be regarded as a natural generalization of Cayley's hyperdeterminant for $2 \times 2 \times 2$ arrays.

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