The Luoshu and most perfect pandiagonal magic squares

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Abstract

First the structure of 3×3 magic squares is investigated. It is shown that these squares can be represented by dyadic products of three mutually orthogonal vectors. Their Moore-Penrose inverse, numerical range and polar decomposition are derived. In the second part 4×4 pandiagonal magic squares are studied. Based on a simple representation with four mutually orthogonal vectors, many features of these magic squares like EP-ness, normality, symmetry and associatedness are considered. The talk is highlighted by a 4×4 pandiagonal magic square with numerous patterns, consisting of prime numbers only.