Some results on magic matrices

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Abstract

The aim of this work is to investigate certain properties of *magic matrices*, i.e. square matrices of order n satisfying the following conditions:
(m1) the entries of A belong to the set $\{1, 2, \ldots, n^2\}$
(m2) if $(i, j) \neq (k, l)$ then $a_{ij} \neq a_{kl}$
(m3) the sums of each row, each column, main diagonal and antidiagonal are equal.
We focus our attention to their squares, higher powers and numerical ranges of magic matrices and their powers (we present an estimation in general case and an exact formulas in special cases). Some open problems are also proposed.

Keywords

Magic matrix, Numerical range.

References

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