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ON MELANCHOLIC MAGIC SQUARES¹

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Abstract

Starting with Dürer's magic square which appears in the well-known copper plate engraving *Melencolia* we consider the class of melancholic magic squares. Each member of this class exhibits the same 86 patterns of Dürer's magic square and is magic again. Special attention is paid to the eigenstructure of melancholic magic squares, their group inverse and their Moore-Penrose inverse. It is seen how the patterns of the original Dürer square to a large extent are passed down also to the inverses of the melancholic magic squares.

Keywords: magic squares, patterns, group inverse, Moore-Penrose inverse, eigenvalues and eigenvectors.

2010 Mathematics Subject Classification: 00A08, 15A09, 15A18.

¹Dedicated to George Styan on the occasion of his 75th birthday.

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