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THE MINIMUM RANK PROBLEM OVER FINITE FIELDS[*]

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Abstract. The structure of all graphs having minimum rank at most k over a finite field with q elements is characterized for any possible k and q. A strong connection between this characterization and polarities of projective geometries is explained. Using this connection, a few results in the minimum rank problem are derived by applying some known results from projective geometry.

Key words. Minimum rank, Symmetric matrix, Finite field, Projective geometry, Polarity graph, Bilinear symmetric form

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