

Usage of shadow (local) geometry to find $W(23, 16)$

A. Goldberger Tau Tel-Aviv, Y. Strassler Danyishay and G.Dula* Nac Netanya. ISRAEL.

A weighing matrix $W(n, k)$ is an $n \times n$ matrix with entries in $\{0, \pm 1\}$ which satisfies that $WW^T = kI_n$. Given a weighing matrix W , the matrix obtained from W by taking absolute values componentwise (denoted G) is called a (quasi)geometry. The points and lines of the geometry correspond to columns and rows of the incidence matrix G . The part of the geometry that intersects a fixed line is called a local geometry LG . The properties of W imply properties of G and of LG . Those can be used as necessary conditions for the existence of W . In this case we were able to use the necessary conditions to form a construction, finding LG and then finding G and then finding W .

Keywords: weighing matrix, geometry, local geometry