Magic Squares — No Given Sum

Friday, July 7, 2023 18:01

Suppose that the sum k is not given, and is unknown just like the α variables. In this case, the sum is added as the $(\alpha+1)^{th}$ variable and so A is $(2n+2) \times (\alpha+1)$.

Rearranging our previous equations:

Sum of variables in lane $=$

Constant Sum $-$ sum of givens in lane

(lane = row, column, or diagonal)

↳ Sum of variables $-$ constant sum

$=$ $-$ Sum of givens

thus the $(\alpha+1)^{th}$ column of A is just the vector $-\underline{1}$

$= \begin{bmatrix} -1 \\ \vdots \\ -1 \end{bmatrix} \in \mathbb{R}^{2n+2}$.

The vector $\underline{b}$ is now simply $-\underline{e}$ (instead of $\underline{k} - \underline{e}$).