

$$q(n) = \begin{pmatrix} 1 & & & & & & & & 1 \\ -1 & 1 & & & & & & & 0 \\ -1 & -1 & 1 & & & & & & -1 \\ 0 & -1 & -1 & 1 & & & & & 0 \\ 0 & 0 & -1 & -1 & 1 & & & & -1 \\ 1 & 0 & 0 & -1 & -1 & 1 & & & 0 \\ 0 & 1 & 0 & 0 & -1 & -1 & 1 & & 0 \\ 1 & 0 & 1 & 0 & 0 & -1 & -1 & & 0 \\ \vdots & & & & & & & \ddots & \vdots \end{pmatrix}_{(n+1) \times (n+1)},$$