№5

$$A=\frac{1}{2}\begin{bmatrix} a & 1 & -1 & -1 \\ b & 1 & 1 & 1 \\ c & -1 & -1 & 1 \\ d & -1 & 1 & -1 \end{bmatrix} = B$$

$$A^T = \frac{1}{2}\begin{bmatrix} a & b & c & d \\ 1 & 1 & -1 & -1 \\ -1 & 1 & -1 & 1 \\ -1 & 1 & 1 & -1 \end{bmatrix} = B^T$$

$$AA^T = E$$

$$\frac{1}{4}BB^T = E$$

$$BB^T = \begin{bmatrix} a & 1 & -1 & -1 \\ b & 1 & 1 & 1 \\ c & -1 & -1 & 1 \\ d & -1 & 1 & -1 \end{bmatrix}\begin{bmatrix} a & b & c & d \\ 1 & 1 & -1 & -1 \\ -1 & 1 & -1 & 1 \\ -1 & 1 & 1 & -1 \end{bmatrix} = \begin{bmatrix} a^2+3 & ab+1 & & \\ ab-1 & b^2+3 & & \\ ac-1 & cb-1 & c^2+3 & \\ ad-1 & db-1 & cd-1 & d^2+3 \end{bmatrix}$$

$$a^2+3=4$$

$$a^2=1 \Rightarrow a=\pm 1$$

$a=\pm 1$
$b=\pm 1$
$c=\pm 1$
$d=\pm 1$

$ab=1$
$ac=1$
$ad=1$