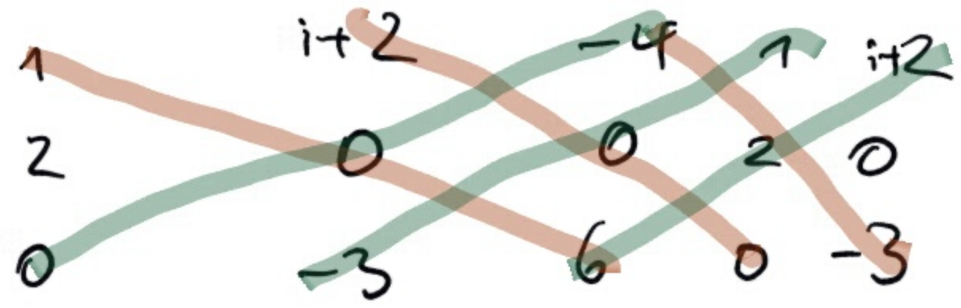
$$B = \begin{pmatrix} 1 & i+2 & -4 \\ 2 & 0 & 0 \\ 0 & -3 & 6 \end{pmatrix}$$



$$\det(B) = 1 \cdot 0 \cdot 6 + (i+2) \cdot 0 \cdot 0 + (-4) \cdot 2 \cdot (-3) - 0 \cdot 0 \cdot (-4) - (-3) \cdot 0 \cdot 1 - 6 \cdot 2 \cdot (i+2)$$

$$= 24 - 12i - 24 = -12i$$

$$\det(B^2) = \det(B \cdot B) = \det(B) \cdot \det(B)$$

$$= (-12i) \cdot (-12i) = 144 i^2 = -144$$

$$B^H = \overline{B^T} = \begin{pmatrix} 1 & 2 & 0 \\ -i+2 & 0 & -3 \\ -4 & 0 & 6 \end{pmatrix}$$

$$\det(B^H) = 1 \cdot 0 \cdot 6 + 2 \cdot (-3) \cdot (-4) + 0 \cdot (-i+2) \cdot 0 - (-4) \cdot 0 \cdot 0 - 0 \cdot (-3) \cdot 1 - 6 \cdot (-i+2) \cdot 2$$

$$= 12i$$

$$\det(B^H B) = \det(B^H) \cdot \det(B) = 12i \cdot (-12i) = 144$$