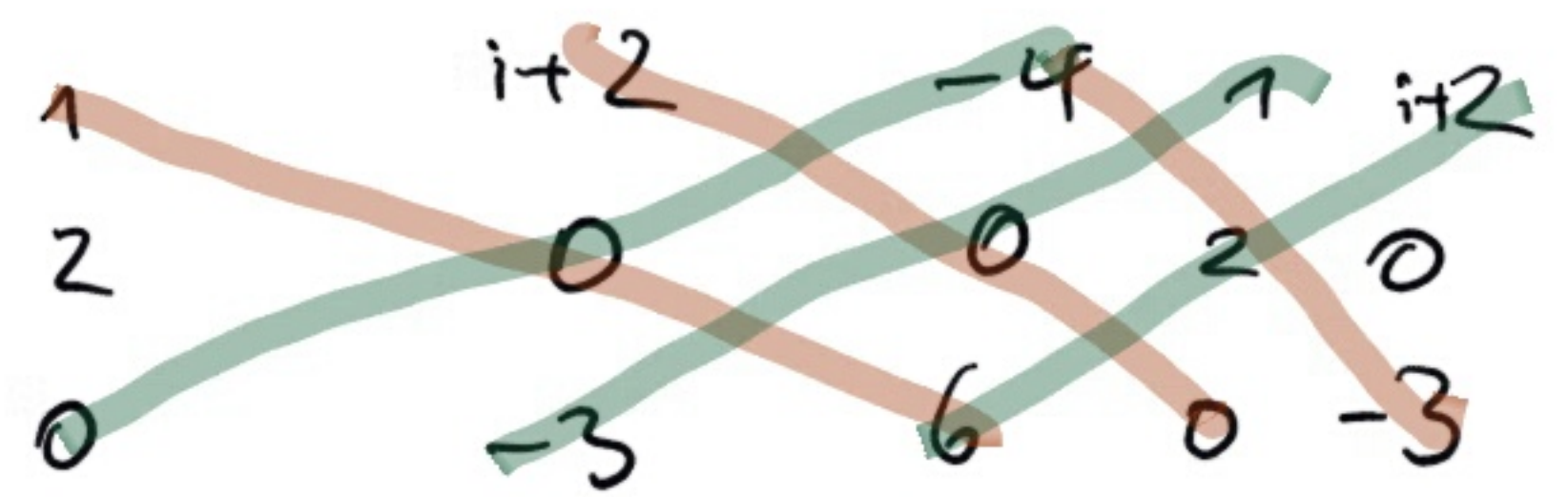


$$B = \begin{pmatrix} 1 & i+2 & -4 \\ 2 & 0 & 0 \\ 0 & -3 & 6 \end{pmatrix}$$



$$\begin{aligned} \det(B) &= 1 \cdot 0 \cdot 6 + (i+2) \cdot 0 \cdot 0 + (-4) \cdot 2 \cdot (-3) \\ &\quad - 0 \cdot 0 \cdot (-4) - (-3) \cdot 0 \cdot 1 - 6 \cdot 2 \cdot (i+2) \\ &= 24 - 12i - 24 = -12i \end{aligned}$$

$$\begin{aligned} \det(B^2) &= \det(B \cdot B) = \det(B) \cdot \det(B) \\ &= (-12i) \cdot (-12i) = 144i^2 = -144 \end{aligned}$$

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

$$\begin{aligned} \det(B^H) &= 1 \cdot 0 \cdot 6 + 2 \cdot (-3) \cdot (-4) + 0 \cdot (-i+2) \cdot 0 \\ &\quad - (-4) \cdot 0 \cdot 0 - 0 \cdot (-3) \cdot 1 - 6 \cdot (-i+2) \cdot 2 \\ &= 12i \end{aligned}$$

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