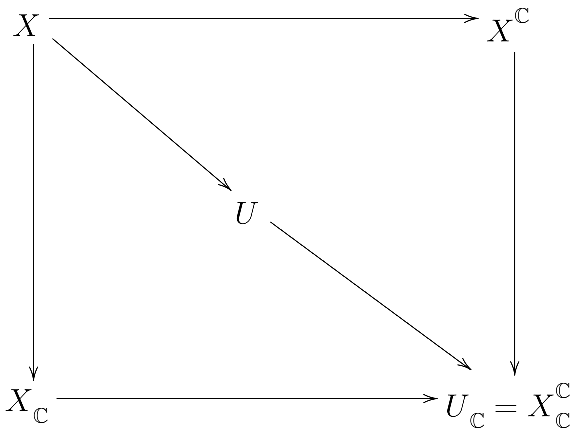
$$Z = X \times Y \times V = U \times V$$

$$Z_{\mathbb{C}} = U_{\mathbb{C}} \times V_{\mathbb{C}}$$

$$r_{\mathbb{C}} = \text{ rank } U_{\mathbb{C}} = \begin{cases} r & ABD \\ 2r & C|BC \end{cases}$$

$$Z_{>} = \frac{u{:}v \in U \times V}{u + u^* - 2vv^* \in X_{>}}$$



$$U = \frac{u \in U_{\mathbb{C}}}{\widetilde{u} = u}$$

$$X = \frac{x \in U}{x^* = x} = \frac{x_{\mathbb{C}} \in X_{\mathbb{C}}}{\widetilde{x}_{\mathbb{C}} = x_{\mathbb{C}}} = \frac{x \in X^{\mathbb{C}}}{\bar{x} = x}$$

$$X_{\mathbb{C}} = \frac{x_{\mathbb{C}} \in U_{\mathbb{C}}}{x^*_{\mathbb{C}} = x_{\mathbb{C}}}$$

$$X^{\mathbb{C}} = \frac{u_{\mathbb{C}} \in U_{\mathbb{C}}}{\widetilde{u}_{\mathbb{C}} = u^*_{\mathbb{C}}}$$

$$u_{\mathbb{C}} : v_{\mathbb{C}} \in Z_{\mathbb{C}} \Longrightarrow u_{\mathbb{C}} + \widetilde{u}^*_{\mathbb{C}} - 2\, v_{\mathbb{C}}\, \widetilde{v}^*_{\mathbb{C}} \in X^{\mathbb{C}}_{>}$$

$$u_{\mathbb{C}} + \widetilde{u}^*_{\mathbb{C}} - 2\, v_{\mathbb{C}}\, \widetilde{v}^*_{\mathbb{C}} \in X^{\mathbb{C}} \sqsubset U_{\mathbb{C}}$$

$$\Re_{\mathbb{C}} \left(u_{\mathbb{C}} + \widetilde{u}^*_{\mathbb{C}} - 2 v_{\mathbb{C}} \widetilde{v}^*_{\mathbb{C}} \right) = u_{\mathbb{C}} + \widetilde{u}^*_{\mathbb{C}} - 2\, v_{\mathbb{C}}\, \widetilde{v}^*_{\mathbb{C}} + u^*_{\mathbb{C}} + \widetilde{u}_{\mathbb{C}} - 2\, \widetilde{v}_{\mathbb{C}}\, v^*_{\mathbb{C}}$$

$$= \underbrace{u_{\mathbb{C}} + u^*_{\mathbb{C}} - 2 v_{\mathbb{C}} v^*_{\mathbb{C}}}_{\in X^{>}_{\mathbb{C}}} + \underbrace{\widetilde{u}_{\mathbb{C}} + \widetilde{u}^*_{\mathbb{C}} - 2 \widetilde{v}_{\mathbb{C}} \widetilde{v}^*_{\mathbb{C}}}_{\in X^{>}_{\mathbb{C}}} + 2 \underbrace{\underbrace{v_{\mathbb{C}} - \widetilde{v}_{\mathbb{C}}}\,\underbrace{v_{\mathbb{C}} \overset{*}{-} \widetilde{v}_{\mathbb{C}}}}_{\in X^{\geqslant}_{\mathbb{C}}} \in X^{>}_{\mathbb{C}} \cap X^{\mathbb{C}} = X_{>}$$