$$L^2\left(\mathbb{P}\left(\mathbb{C}^d\right)\right) = \sum_{m}^{\mathbb{N}} < \overbrace{\underbrace{\zeta|a}\,\underbrace{\alpha|\zeta}}^{m} >$$

$$\zeta \in \mathbb{S}^{2d-1} \to \mathbb{P}\left(\mathbb{C}^d\right) \ni \mathbb{C}\zeta$$

$$\overbrace{\underbrace{\zeta|b}\,\underbrace{a|\zeta}}^{m}$$

$$\overbrace{\underbrace{\zeta k|b}\,\underbrace{a|\zeta k}}^{m} = \overbrace{\underbrace{\zeta|bk^*}\,\underbrace{ak^*|\zeta}}^{m}$$

$$\overbrace{\underbrace{\zeta|b}\,\underbrace{a|\zeta}}^{m}\;\overbrace{\underbrace{\zeta|\beta}\,\underbrace{\alpha|\zeta}}^{n} = \overbrace{\zeta|b}^{m}\;\overbrace{\zeta|\beta}^{n}\;\overbrace{a|\zeta}^{m}\;\overbrace{\alpha|\zeta}^{n} = \overbrace{\zeta|c}^{m+n}\;\overbrace{\gamma|\zeta}^{m+n} = \overbrace{\underbrace{\zeta|c}\,\underbrace{\gamma|\zeta}}^{m+n}$$

$$\zeta = \frac{\begin{bmatrix} z & 1 \end{bmatrix}}{\sqrt{1 + z|z}}$$

$$\overbrace{\underbrace{\zeta|a}\,\underbrace{\alpha|\zeta}}^{m}$$

$$\begin{bmatrix} z & 1 \end{bmatrix} \begin{bmatrix} a^* \\ b^* \end{bmatrix} \begin{bmatrix} c & d \end{bmatrix} \begin{bmatrix} z^* \\ 1 \end{bmatrix} = \left(za^* + b^*\right)\left(cz^* + d\right) = z\,a^*c\,z^* + z\,a^*d + b^*c\,z^* + b^*d$$