



$$C^1 \hat{U}^0 = \hat{I} \otimes |0\rangle\langle 0| + \hat{U} \otimes |1\rangle\langle 1|$$

$$= \hat{I} \otimes \hat{I} + (\hat{U} - \hat{I}) \otimes |1\rangle\langle 1|$$