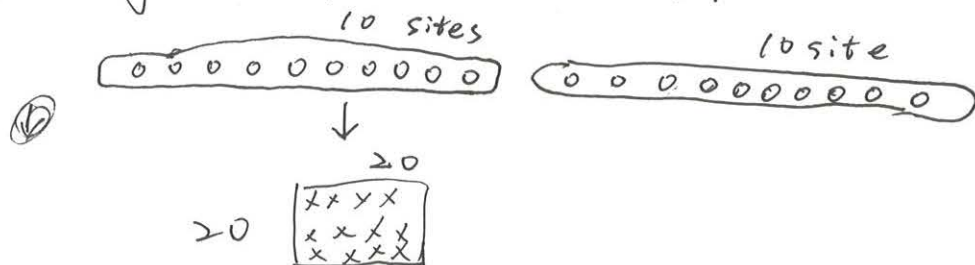
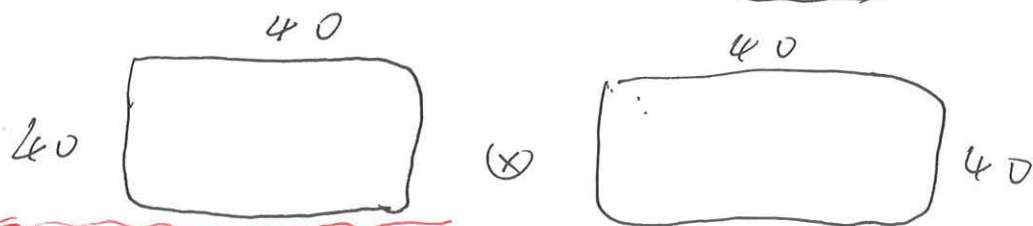
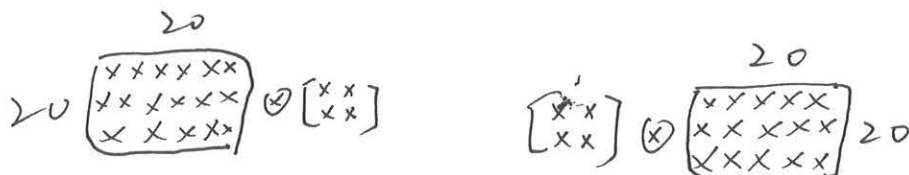


将 eigen 和 Transform matrix 保留下来

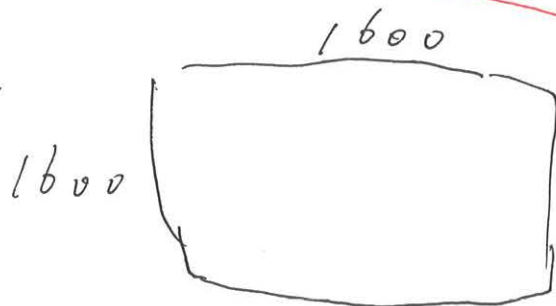


进行

f-dmrg 的第一步



⇒ superblock



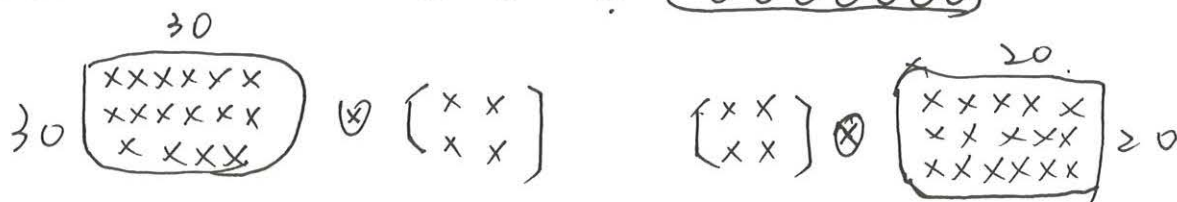
Transfer matrix



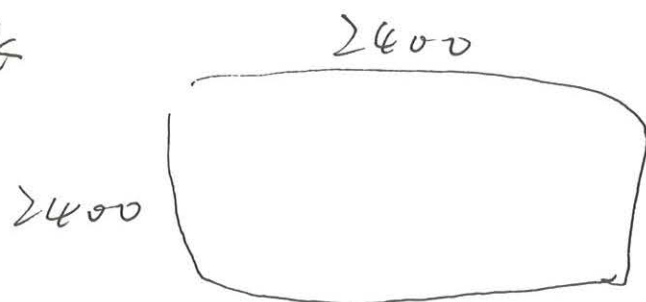
⇒  $\psi_{i0} = (xxxxxx)_{1600 \times 1}$

1600x1 two vector. 截断到 30

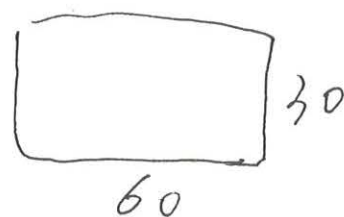
截断到  $m=30$



⇒ superblock

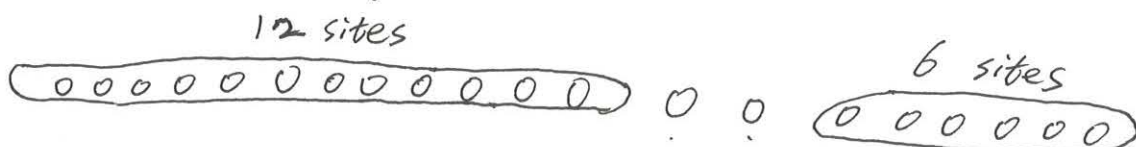


Transfer matrix



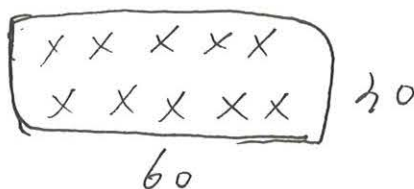
⇒  $\psi_{Si0} = (x \ x \ x \ x \ x \ x)_{2400 \times 1}$   $\xrightarrow{2400 \times 1 \text{ no-}} \psi_{\text{Vector}}$

截断到  $m=30$



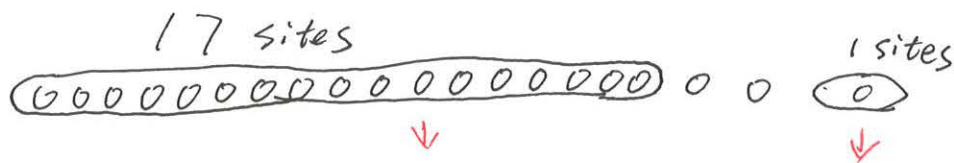
⇒  $\psi_{Si0} = (x \ x \ x \ x \ x \ x \ x \ x)_{2400 \times 1}$   $\xrightarrow{2400 \times 1 \text{ no-}} \psi_{\text{Vector}}$

⇒ Transfer matrix

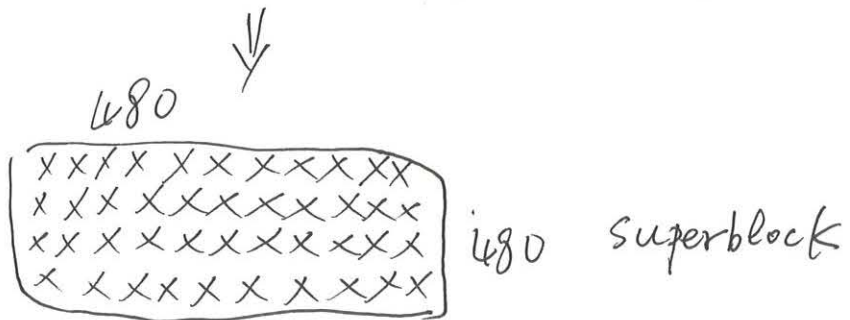
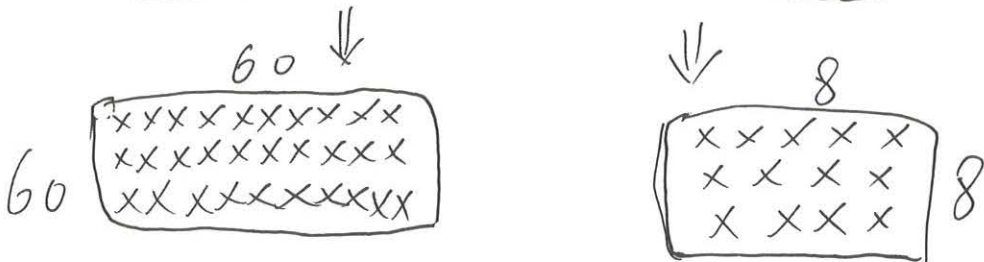
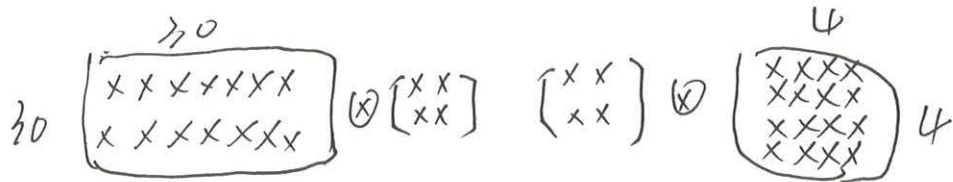
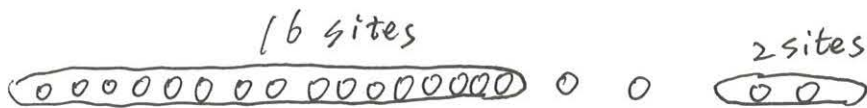


⇒  $\psi_{Si0} \text{ shape} = (2400, 1)$   $\star$   $\text{Transfer matrix shape} = (60, 30)$   $\star$

一直在持续到.  $\text{sys.length} = L - 2 - 1$



sys 和 env 互换

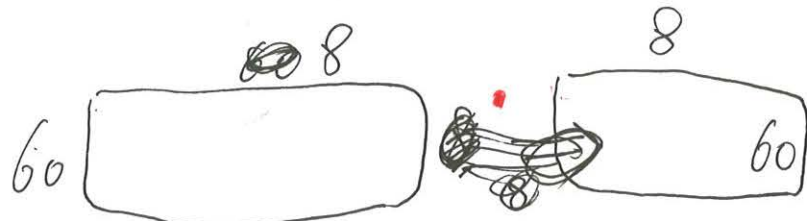


$$\Rightarrow \psi_{i0} = (xxxxxx)_{480 \times 1}$$

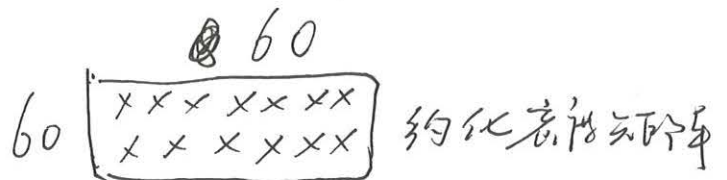
$\Rightarrow$  Transform matrix

$$|\psi\rangle\langle\psi|$$

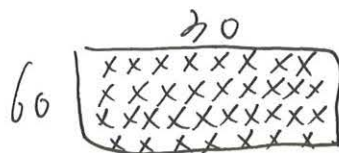
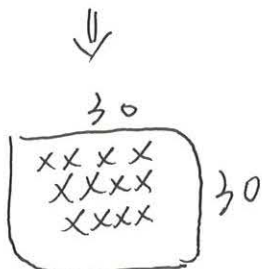
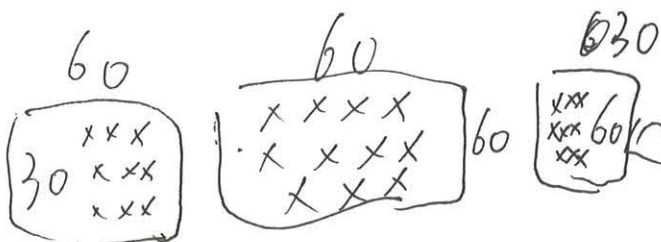
$$= |\psi_{i0}\rangle\langle\psi_{i0}|$$

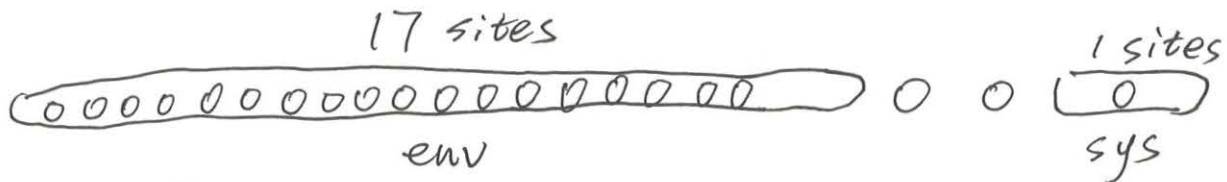


~~截断~~ Truncation

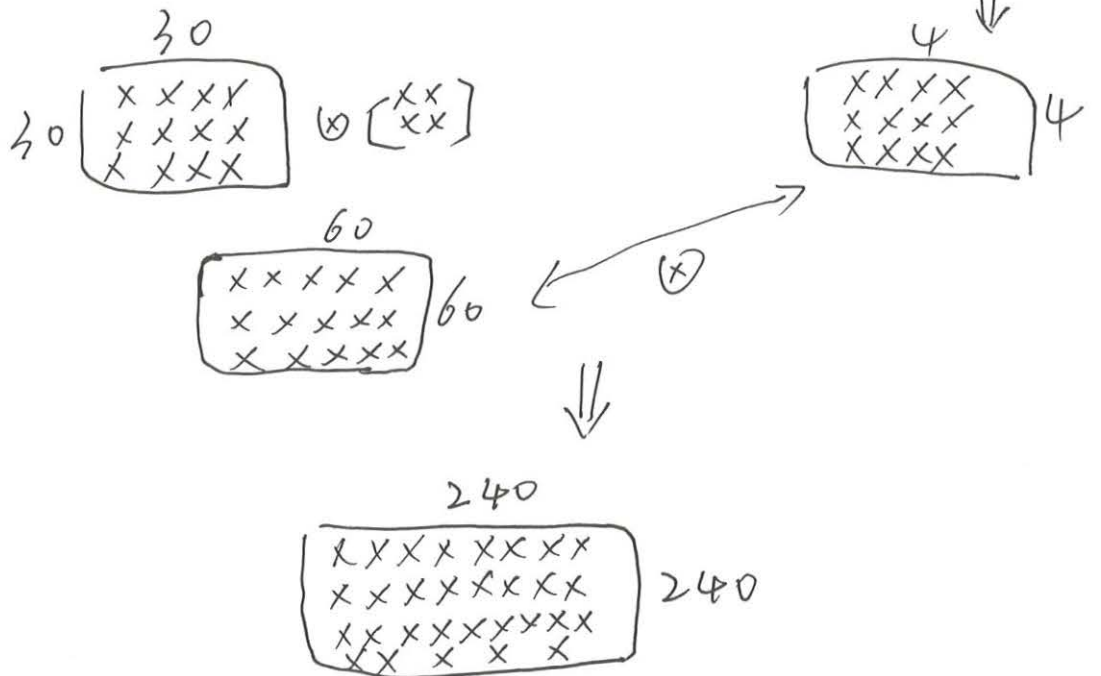


~~截断~~





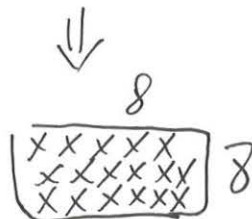
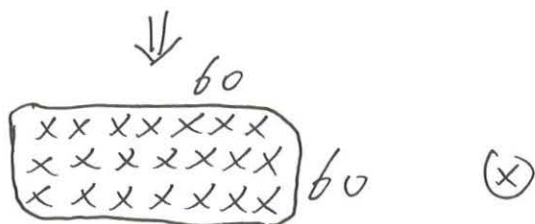
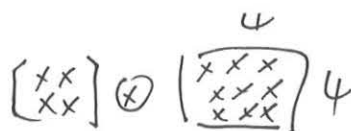
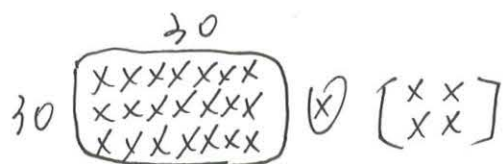
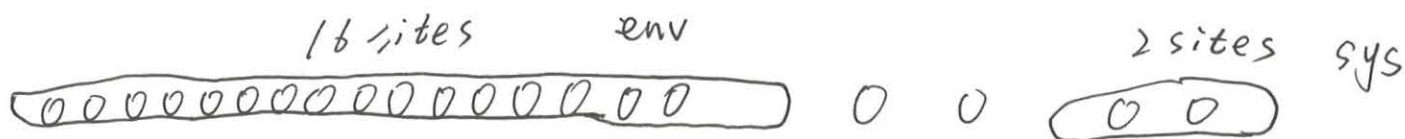
(sys 和 env 角色互换)



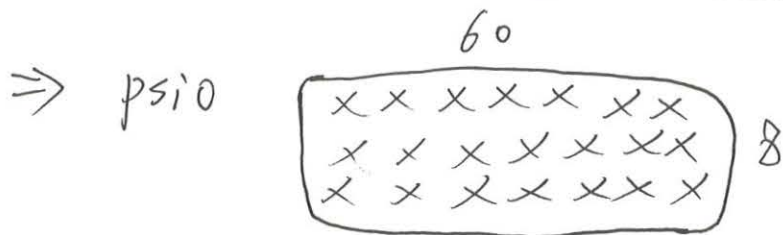
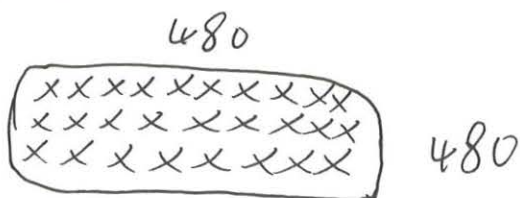
$$\Rightarrow \textcircled{1} \text{ } \psi_{\text{SIO}} = (x x x x x x x x)_{240 \times 1}$$

$$\Rightarrow \text{Transformatrix } 4 \begin{matrix} 60 \\ \boxed{\phantom{000000}} \end{matrix} \cdot \begin{matrix} 60 \\ \boxed{\phantom{000000}} \end{matrix} 4$$

$$|\psi_{\text{SIO}}\rangle \langle \psi_{\text{SIO}}| \Rightarrow 4 \begin{matrix} 4 \\ \boxed{\begin{matrix} x & x & x & x \\ x & x & x & x \\ x & x & x & x \end{matrix}} \end{matrix}$$

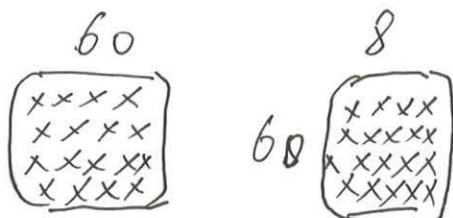


⇒ superblock

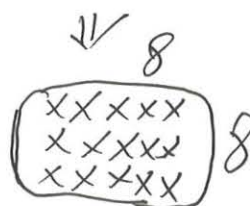


(x x x x x) 480 x 1

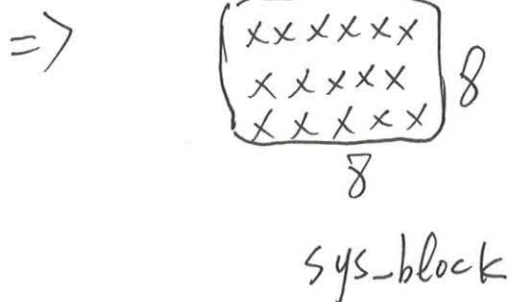
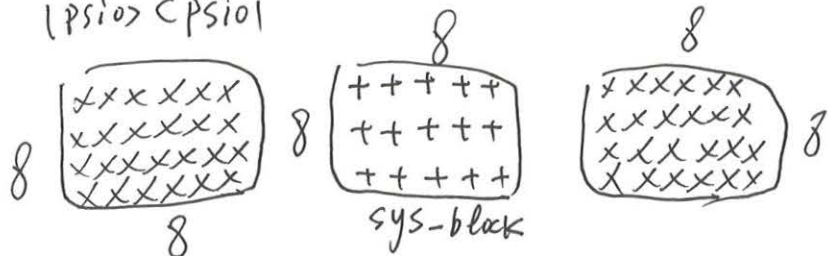
⇒ Transmatrix  $|psio\rangle\langle psio| = 8$



⇒ renormalization



$|psio\rangle\langle psio|$





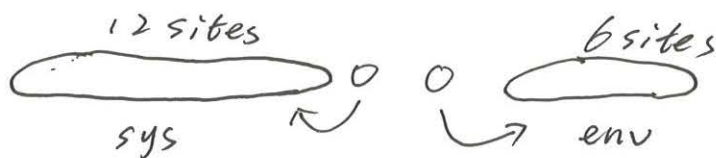
# 记录转移顺序



index shape  
[(l, 11), 60x30]



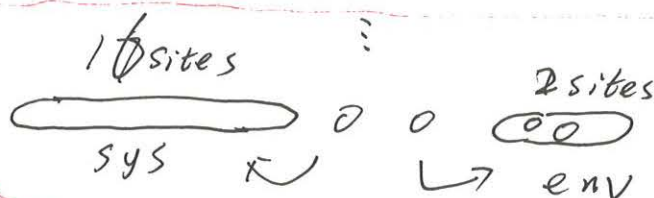
[(l, 12), 60x30]



[(l, 13), 60x30]

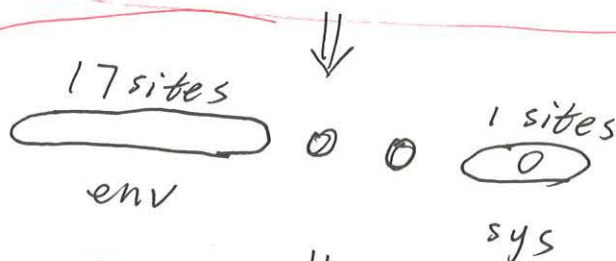


[(l, 14), 60x30]

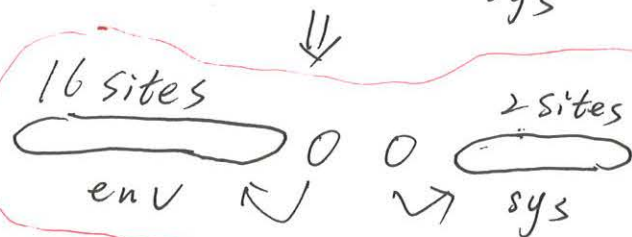


[(l, 17), 60x30]

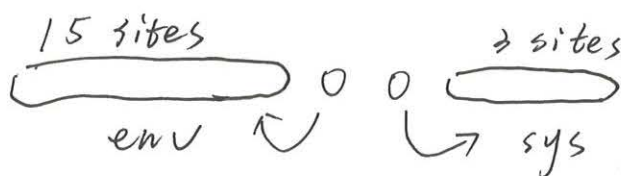
系统和环境  
开始互换



[(r, 2), 4x4]



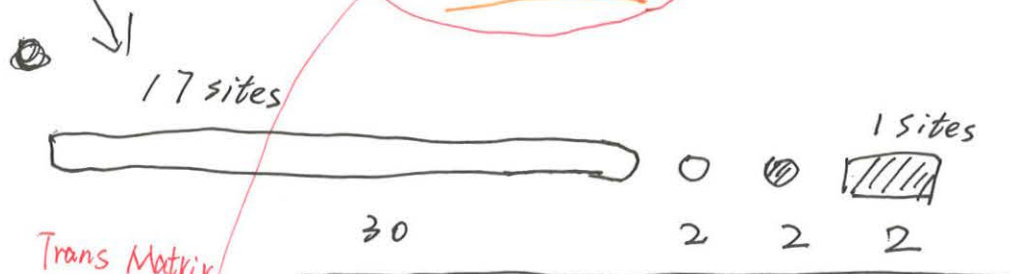
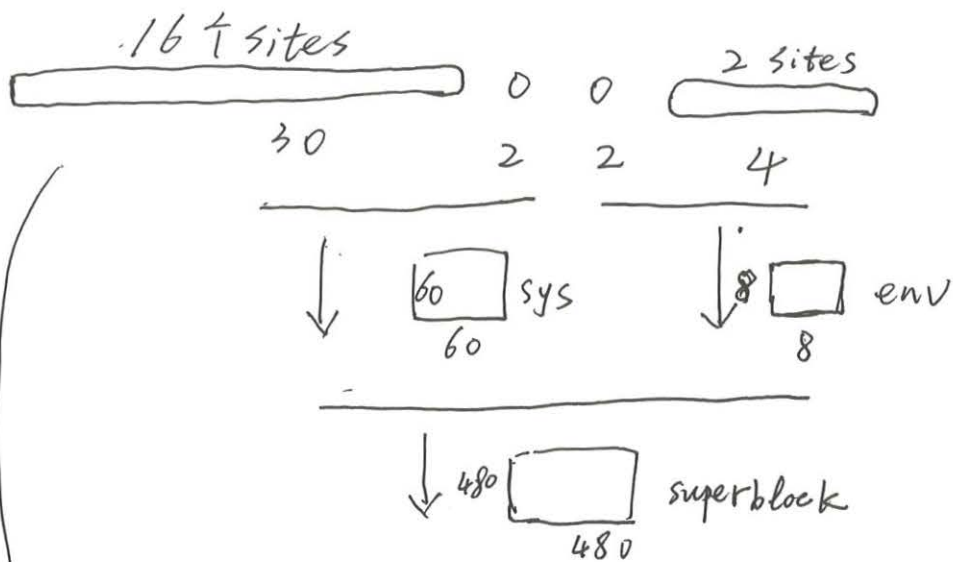
[(r, 3), 8x8]



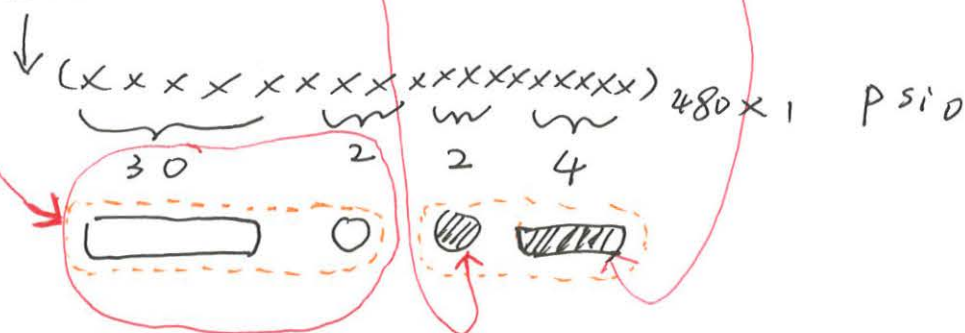
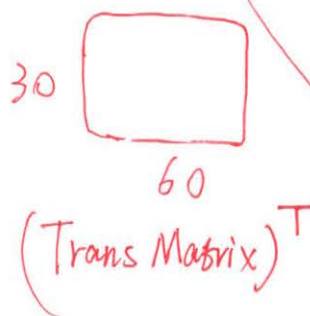
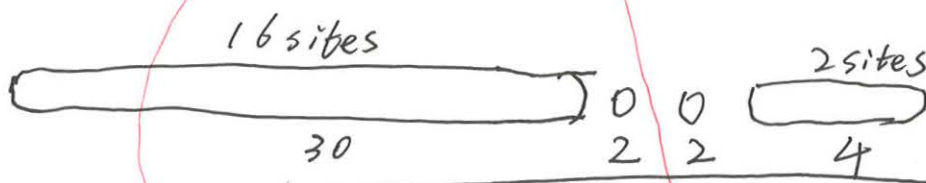
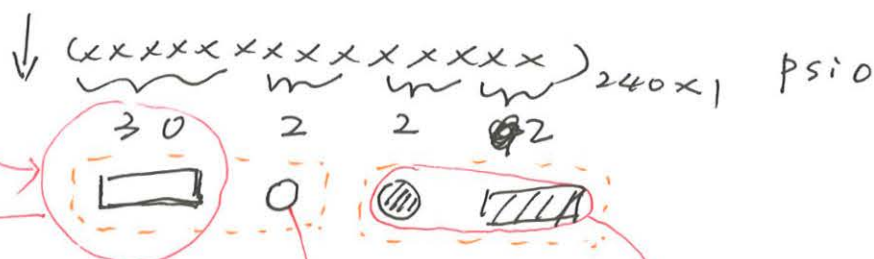
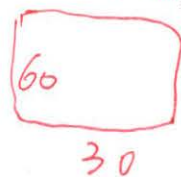
[(r, 4), 16x16]



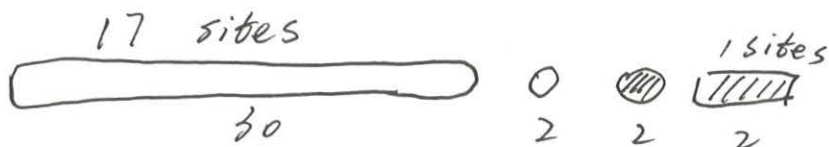
从左往  
右吃一  
个点



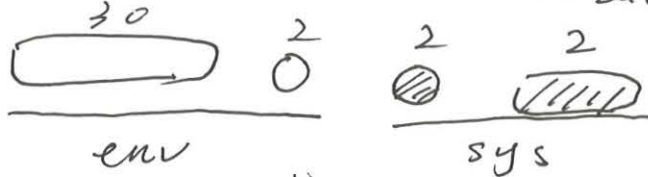
Trans Matrix







↓ (xxxxxxxxxxxxxxxxxxxxxxxx) 240x1     $\psi_{10}$

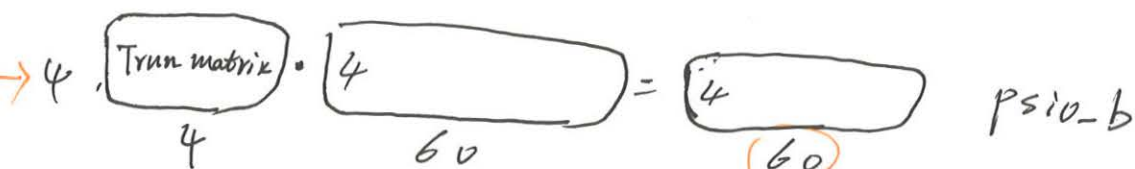


sys 和 env 交换

↓ reshape (-1, env\_mat.shape[1] \* model.nl)



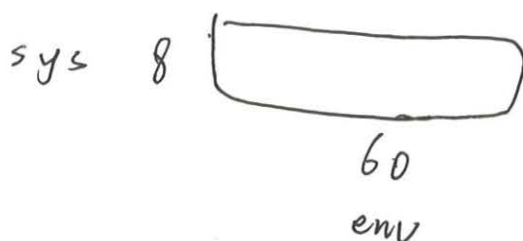
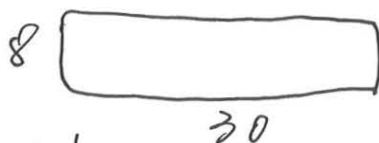
60  
env

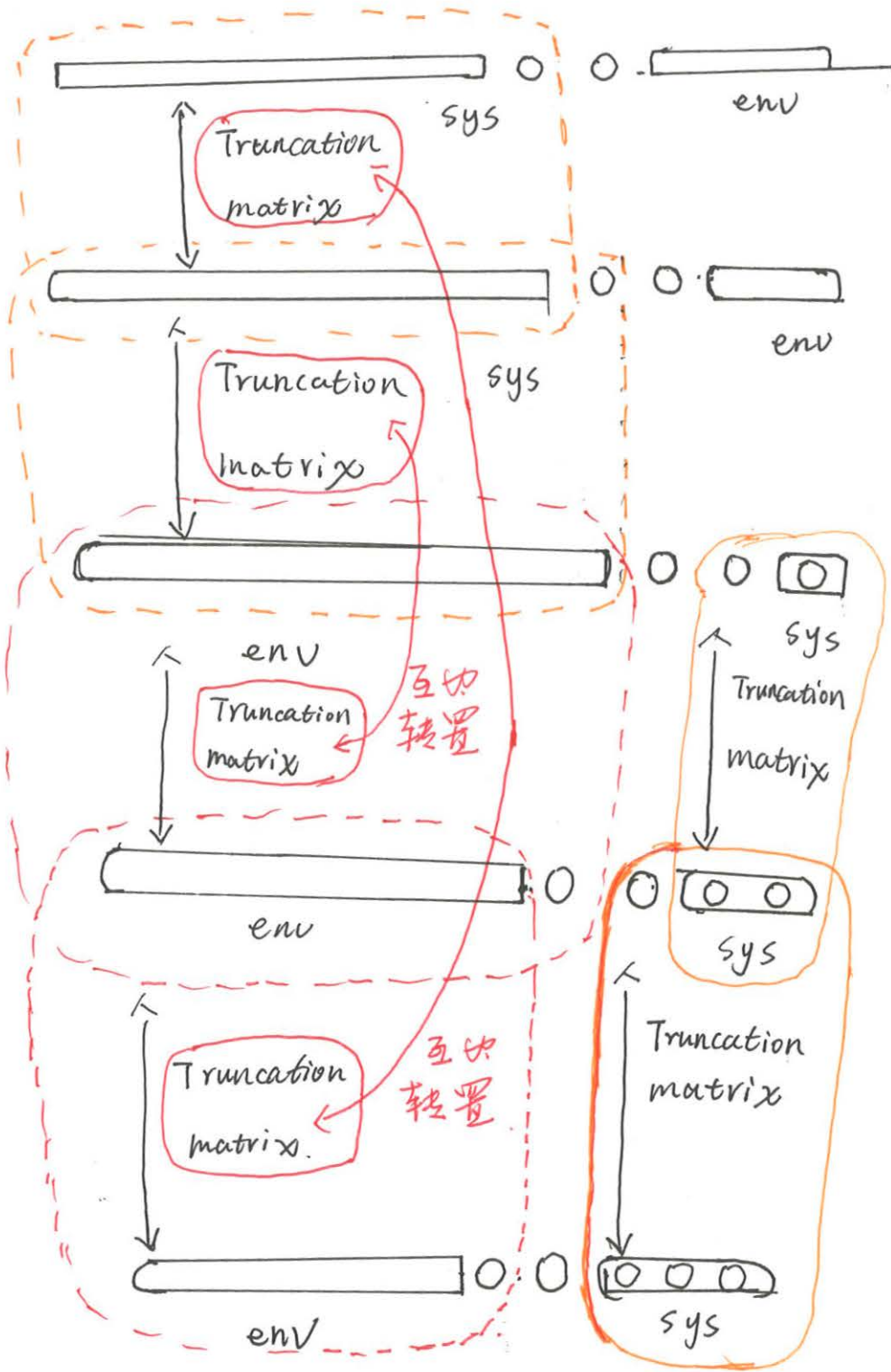


↓ reshape (-1, 30, 2)

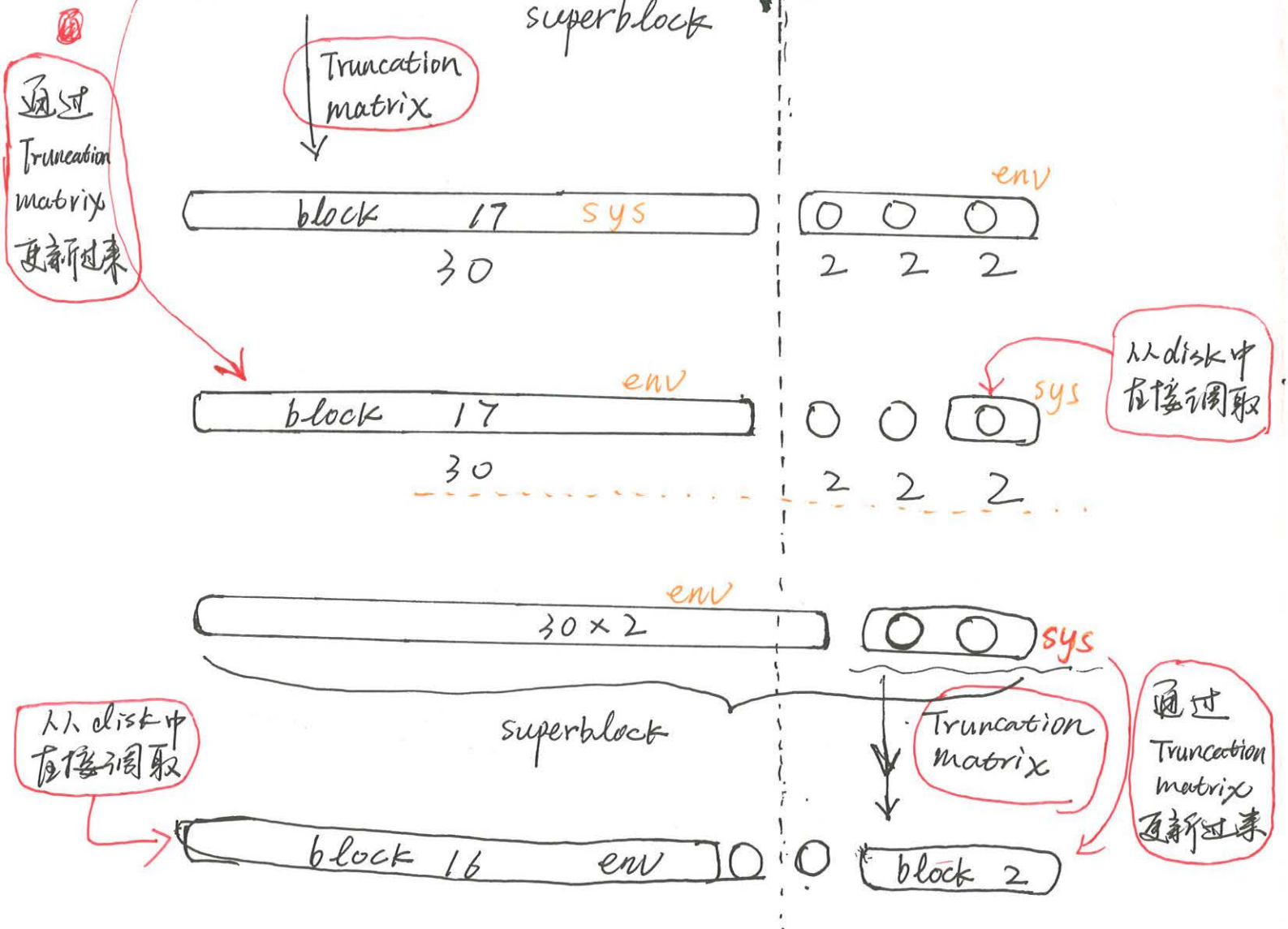
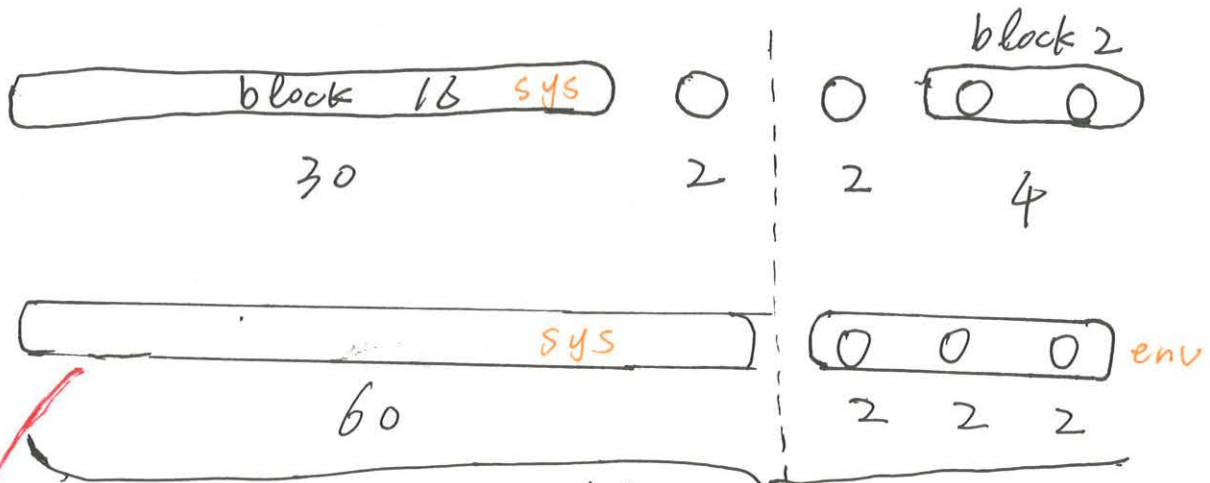
↓ permute (0, 2, 1)

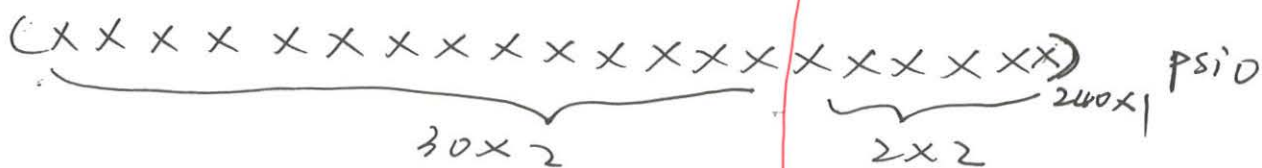
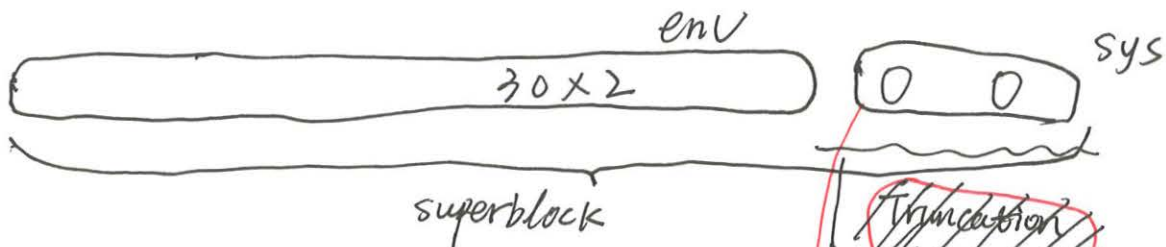
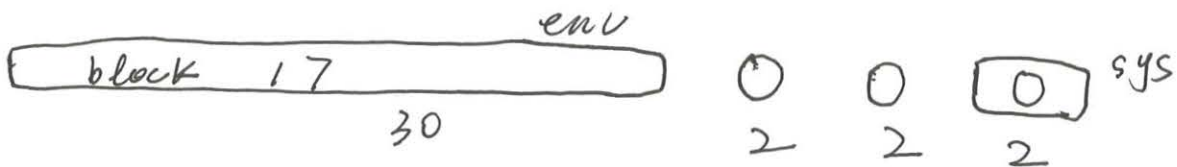
↓ reshape (-1, 30)



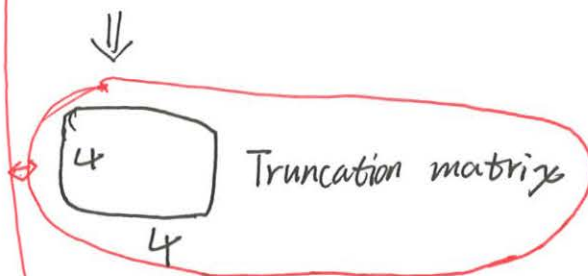


(系统和环境互转)





~~Truncation matrix~~



$$\begin{bmatrix} \text{Truncation matrix} \end{bmatrix}^{-1} \begin{bmatrix} 0 & 0 \end{bmatrix}_{\text{sys}} \begin{bmatrix} \text{Truncation matrix} \end{bmatrix} = \begin{bmatrix} 0 & 0 \end{bmatrix}_{\text{block 2}}$$

$$\begin{bmatrix} 0 & 0 \end{bmatrix}_{\text{sys}} = \begin{bmatrix} \boxed{0} & 0 \end{bmatrix}_{\text{sys} - \text{end}}$$

$$\begin{bmatrix} 0 & 0 \end{bmatrix}_{\text{sys}} |\text{psio}\rangle^{\text{sys}} = \mathbb{Z}_q^{\text{sys}} |\text{psio}\rangle^{\text{sys}}$$

$$\begin{bmatrix} \text{block 2} \end{bmatrix} \begin{bmatrix} \text{Truncation matrix} \end{bmatrix}^{-1} |\text{psio}\rangle^{\text{sys}} \approx \mathbb{Z}_q^{\text{sys}} \begin{bmatrix} \text{Truncation matrix} \end{bmatrix}^{-1} |\text{psio}\rangle^{\text{sys}}$$