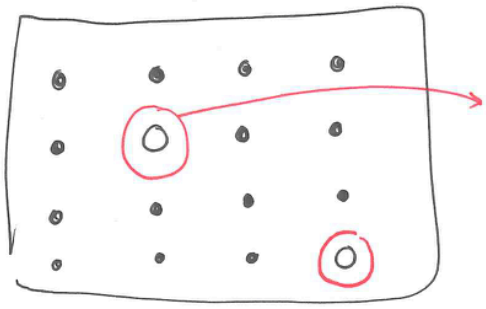
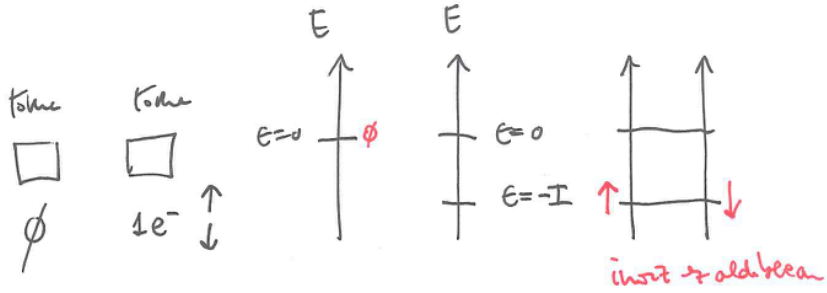
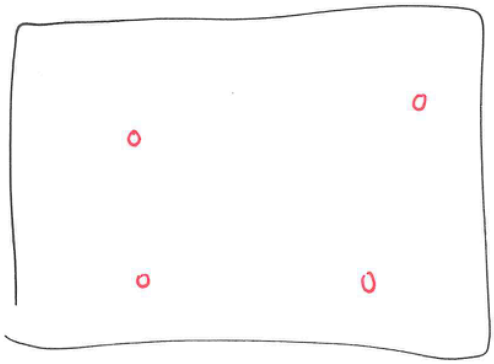
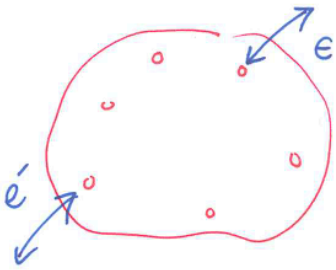
7b)

egzemplarz / etykieta	deskrypcja		N	ε
#1	e^- ez. dego	lokalne	∅	
#2	e^-	lokalne dego ↑	1	
#3	e^-	lokalne dego ↓	1	









sistema trzykia □

homogeneo multizoari degokion termodinamika aztertuko

oraintsu materia-trukean
energia-trukean ⇒ degoela solidoarekin

tokiak → identikoak
independentiak ⇒ $\mathcal{Z}_N \to (\mathcal{Z}_1)^N$
putzipuz bereizgarri $\cancel{\frac{1}{N!}}$ — edozein partizio funtzioarekin

$$\mathcal{Z}_1 \overset{\text{def}}{\equiv} \sum_{N=0}^{\infty} z^N \cdot Z_N(T,V)$$

N dua sistema trzykian "sartzen" duen partikulak gure kasuan N = 0, 1

$$\mathcal{Z}_1 = z^0 \cdot Z_0(T,V) + z^1 \cdot Z_1(T,V)$$

$$\mathcal{Z}_1 = 1 + z \cdot Z_1(T,V)$$

$\downarrow$

partizio-funkcio kanonikoa 1 partikula dogolnean

$$Z_1(T,V) \equiv \sum_{\epsilon} g(\epsilon)\, e^{-\epsilon/k_BT}$$

1 partikula dogolnean $\epsilon = -I$

$g(\epsilon) = 2$

$$Z_1(T,V) = 2e^{I/k_BT}$$

$$\mathcal{Z}_1 = 1 + \underset{\substack{|||\\ e^{\frac{\mu}{k_BT}}}}{z} \cdot 2 \cdot e^{I/k_BT}$$

$$\boxed{\hat{\mathcal{Z}}_1 = 1 + 2\, e^{\left(\frac{\mu+I}{k_BT}\right)}}$$

edozein partikula kopuruekin behatuko probabilitatea da (beti) partizio-funkcio grankanonikoko partikula kopuruaren atala $/\mathcal{Z}$

- ionizatuta egoteko probabilitatea (e^- ik gabe) $N=0$ $\Rightarrow$ $\left[\dfrac{1}{1+2e^{\frac{\mu+I}{k_BT}}}\right]$

- ionizatuta gabe egoteko probabilitate. (e^- ren batekin) $N=1$ $\Rightarrow$ $\dfrac{2e^{\frac{\mu+I}{k_BT}}}{1+2e^{\left(\frac{\mu+I}{k_BT}\right)}}$ edo $1 - P(N=0)$