$$E_n = \frac{\hbar^2}{2m}\sum_{i=1}^{d} k_{n_i}^2 = \frac{\hbar^2}{2m}\sum_{i=1}^{d}\left(\frac{\pi}{L}\right)^2 n_i^2$$

in k-Space: $V_k = \left(\frac{\pi}{L}\right)^d$

$g(k) = \frac{1}{V_k}$ (dos)

$$Z(k) = \frac{1}{V_k} \cdot 2 \cdot \frac{1}{2^d} \cdot V(k) \qquad V(k) = \begin{cases} k & d=1 \\ \pi k^2 & d=2 \\ \frac{4}{3}\pi k^3 & d=3 \end{cases}$$

$\uparrow$ Spin

$\uparrow$ double counting of states

~~g(E)~~

$$k = \frac{\sqrt{2mE}}{\hbar} \Rightarrow Z(E) = \frac{V(E)}{V_k}\frac{1}{2^{d-1}}$$

d=1: $Z(E) = \frac{\sqrt{2mE}\, L}{\pi\hbar}$

d=2: $Z(E) = \frac{\sqrt{2mE}^{\,2} L^2}{2\pi\hbar^2} = \frac{mEL^2}{\pi\hbar^2}$

d=3: $Z(E) = \frac{(2mE)^{\frac{3}{2}} L^3 \frac{4}{3}\pi}{4\pi^3\hbar^3} = \left(\frac{\sqrt{2m}\,L}{\hbar}\right)^3 \frac{1}{3}(E)^{\frac{3}{2}}$

$$Z(1eV) = \begin{cases} 8.63 & d=1 \\ 116.98 & d=2 \\ 6641.98 & d=3 \end{cases}$$

$$g(E) = \frac{1}{L}\frac{\partial Z(E)}{\partial E} = \begin{cases} \frac{\sqrt{2m}\,L}{\pi\hbar\sqrt{E}} & d=1 \\ \frac{mL^2}{\pi\hbar^2} & d=2 \\ \left(\frac{\sqrt{2m}\,L}{\hbar}\right)^3 \frac{\sqrt{E}}{2} & d=3 \end{cases}$$

(diskretisiert mit dE, anstatt 0,1eV)

4) $W = \begin{pmatrix} 0.9 & 0.1 \\ 0.7 & 0.3 \end{pmatrix}$ $\quad P_0 = (1.0)$

$P_5 = P_0 W^5 = \cancel{(0.875, 0.125)}\ (0.769, 0.231) \Rightarrow P = 76.9\%$

b) $P_5 = (0,1)W^5 = (0.692, 0.308) \Rightarrow P = 69.2\%$

c) $(1,0)W^{10} = (0.751512, 0.248488)$ $\quad (0,1)W^{10} = (0.745465, 0.254535)$

$\Rightarrow (1,0)W^\infty = (0,1)W^\infty \rightsquigarrow (0.75, 0.25)$

d) $200 \cdot 0.25 + 150 \cdot 0.75 = 50\left(1 + \frac{9}{4}\right) = 162.5$ €