Aufgabenblatt 4:

Compute the energy density and the magnetisation by summation over all configurations for a 2 x 2, 3 x 3 and 4 x 4 lattice with periodic boundary condititiond for $\beta = 0.0$ up to 1.0 in steps of 0.05 for vanishing external field ($h = 0$). Plot the result.

Remember

$$H = -\sum_{<xy>} s_x s_y \tag{1}$$

(Here we have set $J = 1$.)

The energy density:

$$E = -\frac{1}{V}\sum_{<xy>} s_x s_y \tag{2}$$

where $V = L^2$ for our example.

The magnetisation

$$m = \frac{1}{V}\sum_{x} s_x \tag{3}$$

Compute $< m >$ as well as $< |m| >$. What is the value of $< m >$? Compare the result with the exact value of the magnetisation in the thermodynamic limit.