Exercise 8:
Write a program to simulate the 3D XY model (N=2 nonlinear σ-model)

$$H = -J \sum_{<xy>} \vec{s}_x \vec{s}_y \tag{1}$$

with perodic boundary conditions $(J = 1)$ $|\vec{s}_x| = 1$ and $s_x \in R^2$.
Use the Metropolis and the Overrelaxation algorithm.
To check your program:

L	$-< E >/3$	$V < \vec{m}^2 >$
4	0.40440(44)	19.095(34)
8	0.35585(20)	77.80(15)

für $\beta = 0.45417$. Wobei die Gitter die Grösse $V = L^3$ haben.

$$\vec{m} = \frac{1}{V} \sum_x \vec{s}_x \tag{2}$$

$$E = -\frac{1}{V} \sum_{<xy>} \vec{s}_x \vec{s}_y \tag{3}$$