

# SHEET 1

## EXERCISE 1

Let  $A \subset \Lambda$ . Prove

$$\frac{1}{|\Omega^+|} Z^+[\sigma_A] = C \sum_{\eta \in \mathcal{C}E: \partial \eta = A} w(\eta) \quad \text{where } w(\eta) = \prod_{xy \in \eta} \tanh(J_{xy} \beta)$$

## Exercise 2

Consider Ising model in dimension  $d=1$ .

Let  $\Lambda_n = \{-n, \dots, n\}$ . and  $J_{xy} = \mathbb{1}_{x \sim y}$ . (n.n. interactions)

Compute  $\langle \sigma_{-1} \sigma_{+1} \rangle^+$ .