**Quantum field theory in the solid state, Exercise sheet 4**

**Corrections: Monday $26^{\text{th}}$ of May**

Renormalization group for the Ising model on the triangular lattice.

In class we have discussed the renormalization group for the Ising model on the the triangular lattice. Go through the notes (they are online) and make sure that you understand the calculations that we carried out in first order in the inter-block coupling V.

**(1)** Show that in second order in V, one will generate longer ranged interactions. Hence even if the original Hamiltonian is short ranged, under an RG step all symmetry allowed interactions can be generated.

**(2)** Can you generalize the first order RG equations to include the magnetic field? Can you find the RG flow?

Here is a the reference that I used to prepare the class: Nigel Goldenfeld, *Lectures on phase transitions and the renormalization group*. I encourage you to take the time to go through the calculations, so as to make sure that you have carried out on your own an explicit RG calculation.