The Ising Model and The Statistical Mechanics of Learning

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# The Ising Model

## What it is about

The model consists of discrete variables that represent magnetic dipole moments of atomic “spins” that can be in one of two states (+1 or -1). The spins are arranged in a graph, usually a lattice allowing each spin to interact with its neighbors. Neighboring spins that agree have a lower energy than those that disagree; obviously the system attempts to occupy the lowest possible energy state but heat would disturb this equilibrium, thus creating the possibility of different structural phases. The model allows identification of phase transitions.

## More formal discussion

Consider a set of lattice sites, each with a set of adjacent sites (e.g. a graph) forming a d-dimensional lattice.