Embedding 3D lattice Ising Problems on the D-Wave Processor

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1 Introduction to the Ising Model

$$F(s) \propto e^{-\frac{E(s)}{kT}}$$

$$P(s, s', T) = e^{-\frac{E(s')-E(s)}{T}}$$

Input: $T_i, T_f, num\_sweeps, h, J$**.**

1. Start with a random state s.
2. Let $T\_step = (T_i - T_f)/num\_sweeps$ and $T = T_i$.
3. Repeat num_sweeps times:
   (a) For i in a random permutation of $[1, 2, ..., n]$:
      i. Let $s' = s$.
      ii. Set $s'_i = -s'_i$.
      iii. If $e^{-\frac{E(s')-E(s)}{T}} > random(0, 1)$, let $s = s'$.
   (b) Set $T = T - T\_step$.