Energy function of RBM:

Our notation: defining calculation for x0 -> x1 is forward dir. This equation is the QUBO for RBM.

Converting to Qbits.

,

Energy delta on flipping a Qbit, *q*t, i:

Flipping *q*1, j.

Backward :



Digital annealer.

There’s an expectation to solve NP-hard problems

qyx = q[y][x]

hx = h[x]

qleft = q[y][(N+x-1)%N]

Jx = J[x]

sum = qleft \* J[x][(N+x-1)%N] +q[y][(x+1)%N] \*J[x][(x+1)%N]

dE = (2\*qyx\* (hx +sum))\*1.0/m

dE += -q[y][x]\*(q[(m+y-1)%m][x]+q[(y+1)%m][x])\*np.log(np.tanh(G/kT/m))\*1.0/kT

2 approaches.