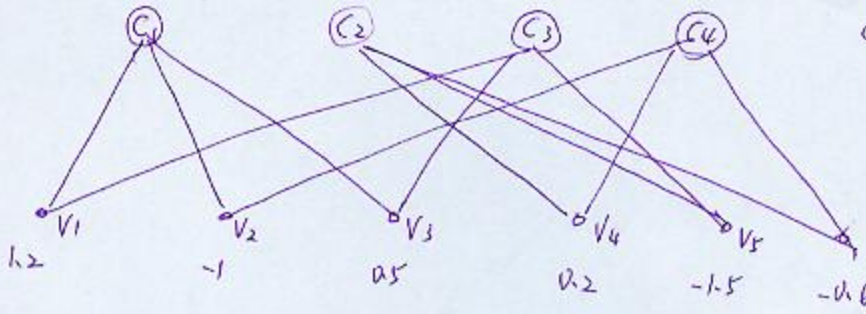
HW 2

1.



check node

variable node.

$$M_{C\to V_1}^{(0)} = M_{V_1}^{(0)} + \log\left[\frac{1+\tanh\left(\frac{V_2}{2}\right)\tanh\left(\frac{V_3}{2}\right)}{1-\tanh\left(\frac{V_2}{2}\right)\tanh\left(\frac{V_3}{2}\right)}\right] + \log\left[\frac{1+\tanh\left(\frac{V_4}{2}\right)\tanh\left(\frac{V_5}{2}\right)}{1-\tanh\left(\frac{V_4}{2}\right)\tanh\left(\frac{V_5}{2}\right)}\right] = 0.965046.$$

the same as $M_{C\to V_1}^{(0)}$:

$\Rightarrow$ $M_{C\to V_2}^{(0)} = -0.91031$

$M_{C\to V_3}^{(0)} = -0.03681$

$M_{C\to V_4}^{(0)} = 0.680229$

$M_{C\to V_5}^{(0)} = -1.41031$

$M_{C\to V_6}^{(0)} = -0.69509$

$\Rightarrow$ hard decision $(0.965046, -0.91031, -0.03681, 0.680229, -1.41031, -0.69509)$

$\Rightarrow$ $r = (0\ 1\ 1\ 0\ 1\ 1)$

$\because r \cdot H^T = 0$

$\Rightarrow$ decode signal $\hat{x} = [0\ 1\ 1\ 0\ 1\ 1]$