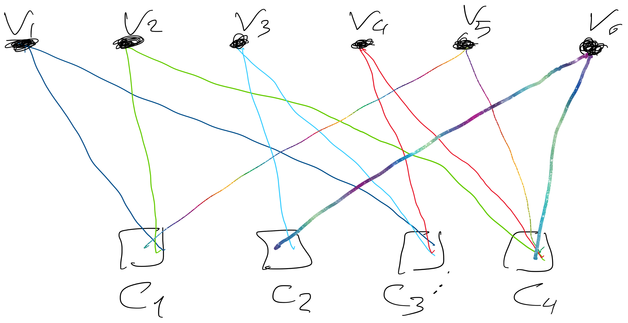
Homework5-3
Tuesday, 10 December 2019 14:57

Haitham Babbili Olalekan Peter Adare

1.

$$H = \begin{bmatrix} 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \\ 1 & 0 & 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 1 & 1 \end{bmatrix}$$



cycle $(V_1) = V_1 \to c_1 \to V_5 \to c_4 \to V_6 \to c_2 \to V_3 \to c_3 \to V_1 = 8$
$= V_1 \to c_3 \to V_4 \to c_4 \to V_2 \to c_1 \to V_1 = 6$

Cycle $(V_2) = V_2 \to c_4 \to V_5 \to c_1 \to V_2 = 4$
$= V_2 \to c_1 \to V_5 \to c_4 \to V_2 = 4$
$= V_2 \to c_1 \to V_1 \to c_3 \to V_3 \to c_2 \to V_6 \to c_4 \to V_2 = 8$

Cycle $(V_3) = V_3 \to c_3 \to V_4 \to c_4 \to V_6 \to c_2 \to V_3 = 6$
$= V_3 \to c_3 \to V_1 \to c_1 \to V_2 \to c_4 \to V_6 \to c_2 \to V_3 = 8$
$= V_3 \to c_2 \to V_6 \to c_4 \to V_4 \to c_3 \to V_3 = 6$

Cycle $(V_4) = V_4 \to c_3 \to V_3 \to c_2 \to V_6 \to c_4 \to V_4 = 6$
$= V_4 \to c_4 \to V_6 \to c_2 \to V_3 \to c_3 \to V_4 = 6$
$= V_4 \to c_3 \to V_1 \to c_1 \to V_5 \to c_4 \to V_4 = 6$
$= V_4 \to c_3 \to V_1 \to c_1 \to V_2 \to c_4 \to V_4 = 6$

Cycle $(V_5) = V_5 \to c_1 \to V_1 \to c_3 \to V_4 \to c_4 \to V_5 = 6$
$= V_5 \to c_1 \to V_1 \to c_3 \to V_3 \to c_2 \to V_6 \to c_4 \to V_5 = 8$
$= V_5 \to c_1 \to V_2 \to c_4 \to V_5 = 4$
$= V_5 \to c_4 \to V_4 \to c_3 \to V_1 \to c_1 \to V_5 = 6$
$= V_5 \to c_4 \to V_2 \to c_1 \to V_1 \to c_3 \to V_4 \to c_4 \to V_5 = 8$

cycle $(V_6) = V_6 \to c_2 \to V_3 \to c_3 \to V_4 \to c_4 \to V_6 = 6$
$= V_6 \to c_4 \to V_4 \to c_3 \to V_3 \to c_2 \to V_6 = 6$

---

2. Degree of distribution for check Nodes

$C_1 = 3$

$C_2 = 2$

$C_3 = 3$

$C_4 = 4$

Degree of distribution for Variable Nodes

$V_1 = 2$

$V_2 = 2$

$V_3 = 2$

$V_4 = 2$

$V_5 = 2$

$V_6 = 2$

$\Rightarrow$ it's irregular because W_{ri} is not regular while W_c is regular $\Rightarrow$ The parity check matrix is irregular.