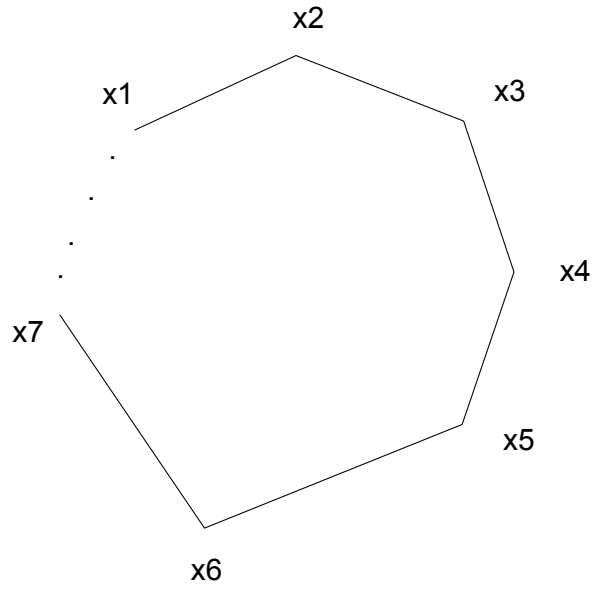
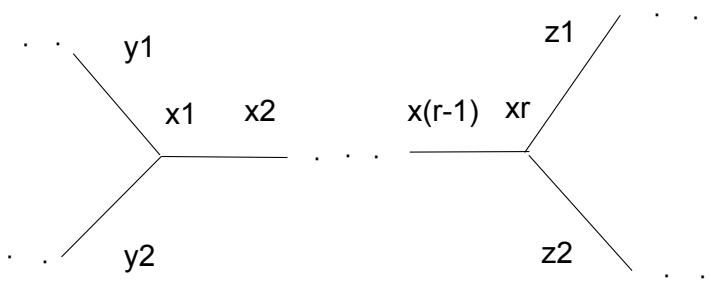
$\mathcal{G}$ ohne cycle subgraph $r \geqslant 3$



$$\overbrace{\left|x_1 + \cdot\cdot + x_r\right|}^{2} = \sum_{1 \leqslant i \leqslant r} x_i^2 + 2\left(x_1|x_2 + x_2|x_3 + \cdot\cdot + x_{r-1}|x_r + x_r|x_1\right) = 2r - 2r = 0$$

$$\Longrightarrow \text{ free } x_1 + \cdot\cdot + x_r = 0 \; \lightning$$

$\mathcal{G}$ ohne bone subgraph $r \geqslant 1$



$$x_i \,|\, x_{i+1} = -1 = x_r \,|\, x_1$$

$$\overline{i-j} > 1 \Longrightarrow x_i \,|\, x_j = 0$$

$$\overbrace{2 \sum_{1 \leqslant i \leqslant r} x_i + y_1 + y_2 + z_1 + z_2}^{2} = 4 \sum_{1 \leqslant i \leqslant r} x_i^2 + y_1^2 + y_2^2 + z_1^2 + z_2^2$$

$$+2 \sum_{1 \leqslant i < r} 2\, x_i \,|\, x_{i+1} + 4\, x_1 \overbrace{y_1 + y_2} + 4\, x_r \overbrace{z_1 + z_2} = 8r + 8 - 8\,(r-1) - 8 - 8 = 0$$

$$\Longrightarrow \text{ free } 2 \sum_{1 \leqslant i \leqslant r} x_i + y_1 + y_2 + z_1 + z_2 = 0 \; \lightning$$