2.5.9

$$A = \begin{pmatrix} -1 & 1 & 0 & 0 \\ -1 & 0 & 1 & 0 \\ 0 & -1 & 1 & 0 \\ 0 & -1 & 0 & 1 \\ -1 & 0 & 0 & 1 \\ 0 & 0 & -1 & 1 \end{pmatrix} ; \quad A^T = \begin{pmatrix} -1 & -1 & 0 & 0 & -1 & 0 \\ 1 & 0 & -1 & -1 & 0 & 0 \\ 0 & 1 & 1 & 0 & 0 & -1 \\ 0 & 0 & 0 & 1 & 1 & 1 \end{pmatrix}.$$

$$A^TA = \begin{pmatrix} 3 & -1 & -1 & -1 \\ -1 & 3 & -1 & -1 \\ -1 & -1 & 3 & -1 \\ -1 & -1 & -1 & 3 \end{pmatrix} ; \quad C = \text{diag}(c_1, c_2, c_3, c_4, c_5, c_6)$$

$$A^TCA = \begin{pmatrix} c_1+c_2+c_5 & -c_1 & -c_2 & -c_5 \\ -c_1 & c_1+c_3+c_4 & -c_3 & -c_4 \\ -c_2 & -c_3 & c_2+c_3+c_6 & -c_6 \\ -c_5 & -c_4 & -c_6 & c_4+c_5+c_6 \end{pmatrix}$$

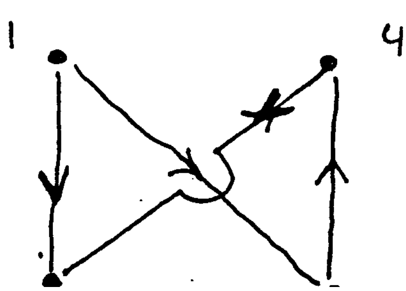
on row j of A^TCA there will appear the conductances corresponding to the edges connected to ~~edge~~ node (j).

(i.e. node 1 : edges (1, 2, 5)
node 2 : edges (1, 3, 4)
node 3 : edges (2, 3, 6)
node 4 : edges (4, 5, 6)).

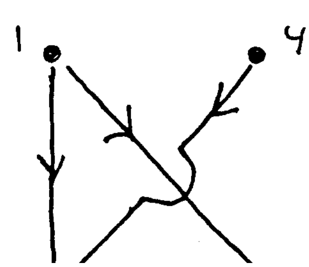
2.5.10

$$\text{if } \begin{array}{cc} & \text{nodes} \\ A = & \begin{pmatrix} -1 & 1 & 0 & 0 \\ -1 & 0 & 1 & 0 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & -1 & 1 \end{pmatrix} \\ \text{edges} & \end{array} \rightarrow A' = \begin{pmatrix} -1 & 1 & 0 & 0 \\ -1 & 0 & 1 & 0 \\ 0 & 1 & 0 & -1 \end{pmatrix}$$

rows of A' are basis of $\mathcal{R}(A)$.



$\longrightarrow$



Spanning tree