Edge-Node Incident Matrix

To analyse a network (especially big ones), we associate with the network a matrix, the **edge-node incident matrix**, and use a computer to study it with methods from linear algebra. For the example here that matrix is

$$
A = \begin{array}{c} \\ 1 \\ 2 \\ 3 \\ 4 \\ 5 \end{array}
\begin{array}{c} \text{nodes} \downarrow \\ \begin{array}{cccc} 1 & 2 & 3 & 4 \end{array} \\ \left[\begin{array}{cccc} -1 & 1 & 0 & 0 \\ -1 & 0 & 1 & 0 \\ 0 & -1 & 1 & 0 \\ 0 & -1 & 0 & 1 \\ 0 & 0 & -1 & 1 \end{array} \right] \end{array}
$$

$\uparrow$ edges

Rules:

- -1 in position ij indicates that edge i points 'out of' node j
- +1 in position ij indicates that edge i points 'into' node j
- 0 in position ij indicates that edge i points neither 'into nor out of' node j