The generator matrix for the continuous Markov chain of Example 11.17 is given by

$$G = \begin{bmatrix} -\lambda & \lambda \\ \lambda & -\lambda \end{bmatrix}.$$

Find the stationary distribution for this chain by solving $\pi G = 0$.

Solution

We obtain

$$\pi G = [\pi_0, \pi_1] \begin{bmatrix} -\lambda & \lambda \\ \lambda & -\lambda \end{bmatrix} = 0.$$

which results in

$$\pi_0 = \pi_1.$$

We also need

$$\pi_0 + \pi_1 = 1.$$

Solving the above equations, we obtain

$$\pi_0 = \pi_1 = \frac{1}{2}.$$

Transition Rate Diagram:

A continuous-time Markov chain can be shown by its **transition rate diagram**. In this diagram, the values g_{ij} are shown on the edges. The values of g_{ii}'s are not usually shown because they are implied by the other values, i.e.,

$$g_{ii} = -\sum_{j \neq i} g_{ij}.$$

For example, Figure 11.24 shows the transition rate diagram for the following generator matrix

$$G = \begin{bmatrix} -5 & 5 & 0 \\ 1 & -2 & 1 \\ 3 & 1 & -4 \end{bmatrix}, \tag{11.8}$$

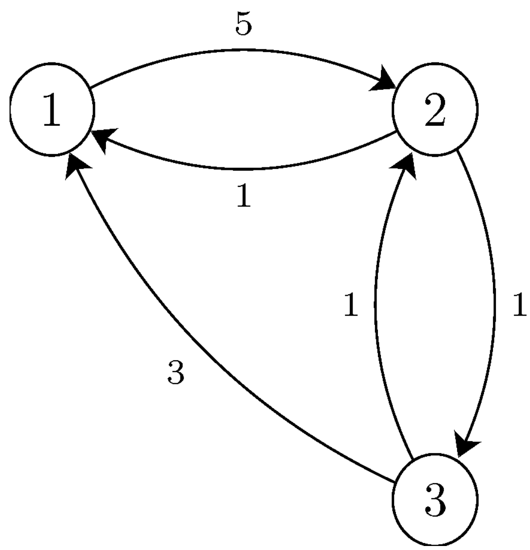

Figure 11.24 - The transition rate diagram for the continuous-time Markov chain defined by Equation 11.8.