Stationarity and Reversibility

- Global balance: at a stationary distribution, the flow of probability mass into and out of each state has to be balanced:

$$\sum_{i=1}^{K} \pi_i T_{ij} = \pi_j = \sum_{k=1}^{K} \pi_j T_{jk}$$

- Detailed balance: the flow of probability mass between each pair of states is balanced:

$$\pi_i T_{ij} = \pi_j T_{ji}$$

- A Markov chain satisfying detailed balance is called reversible. Reversing the dynamics leads to the same chain.
- Detailed balance can be used to check that a distribution is the stationary distribution of a irreducible, periodic, reversible Markov chain.