Detailed Balance

If $$\pi(x)T(x \to x') = \pi(x')T(x' \to x)$$

Then $$\pi(x') = \sum_x \pi(x)T(x \to x')$$

Proof
$$\sum_x \pi(x)T(x \to x') = \sum_x \pi(x')T(x' \to x)$$
$$= \pi(x') \underbrace{\sum_x T(x' \to x)}_{1}$$