[nex105] House of the mouse: mouse with inertia
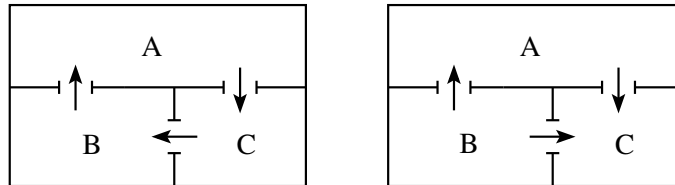
A trained mouse lives in a house with floor plan as shown in two versions. The house has three rooms and three doors. All doors are open one way only. A bell rings at regular time intervals, prompting the mouse with equal probability to either stay put or to make an attempt to go to an adjacent room through any open door without preference.

(a) Construct the transition matrix $\mathbf{W}$ for both floor plans and calculate $\mathbf{W}^s$ for $s = 1, 2, 3$. Describe the resulting pattern of change in each case.

(b) Solve the left-eigenvector problem of matrix $\mathbf{W}$ in each case and interpret the results.

Solution: