

**[nex42] Mixing marbles red and white**

There are two white marbles in cup  $A$  and four red marbles in cup  $B$ . In every step of a Markov process a marble is selected at random from each cup and placed into the opposite cup.

(a) What are the probabilities that after three steps cup  $A$  contains (i) two white marbles, (ii) one white and one red marble, (iii) two red marbles?

(b) What is the limiting probability distribution of the three configurations after many steps?

**Solution:**