

Tutorial 12 Answers

1. (a) States 4 and 5 are transient. The class {1,2,3} is recurrent and not periodic. The class {6,7} is recurrent with period 2.
(b) $\pi_1 = \frac{6}{13}$, $\pi_2 = \frac{6}{13}$, $\pi_3 = \frac{1}{13}$
(c) Steady-state probabilities do not exist because the class {6,7} is periodic.
(d) i. $\mathbf{P}(BFT) = \frac{18}{65}$
ii. $\mathbf{P}(S2|BFT) = \frac{1}{6}$
iii. $\mathbf{P}(BFC) = \frac{7}{13}$
2.
(a) $\mathbf{E}(H) = h$, $\sigma_H = \frac{1.5}{\sqrt{n}}$
(b) $n > 22500$
(c) $n \geq 90,000$
(d) As was shown in G1 of Problem Set 5, if a random variable X only takes on values between 0 and some c ($c > 0$), then $\text{var}(X) \leq \frac{c^2}{4}$. Therefore $\sigma_x \leq \frac{c}{2}$. In this problem $c = 3$, and therefore the standard deviation of the heights of Canadians is less than or equal to 1.5.
3. **Practice Problem:**
(a) Yes, 0
(b) No
(c) Yes, 0