Math 530

Autumn 2006

Solution to 3.2.14

Let A_i be the event that at least one person gets off at floor i and let I_{A_i} be the indicator random variable of A_i. Then

$$N = \sum_{i=1}^{10} I_{A_i}$$

is the number of different stops that the elevator makes. Note that

$$1 - P(A_i) = \left(\frac{9}{10}\right)^{12}$$

So

$$E(N) = \sum_{i=1}^{10} E(I_{A_i}) = 10E(I_{A_i}) = 10P(A_i) = 10 - 10\left(\frac{9}{10}\right)^{12} = \mathbf{7.176}$$