

IMM - DTU

02405 Probability
2003-11-2
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$$P(A_2 > A_1 + 2)$$

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Question a) Define A_1 and A_2 as the arrival times of Jack and Jill respectively. The probability in question is

$$P(A_2 > A_1 + 2) = \frac{1}{2} \left(\frac{13}{15} \right)^2$$

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$$P(A_2 > A_1 + 2) = \frac{1}{2} \left(\frac{13}{15} \right)^2 = \frac{169}{450}$$

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$$P(A_2 > A_1 + 2) = \frac{1}{2} \left(\frac{13}{15} \right)^2 = \frac{169}{450} = 0.3756$$

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$$P(A_{(1)} < 5, 10 < A_{(10)}) = 1 - (1-x)^n - y^n + (y-x)^n$$

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$$P(A_{(1)} < 5, 10 < A_{(10)}) = 1 - (1-x)^n - y^n + (y-x)^n = 1 - \left(\frac{2}{3} \right)^{10} - \left(\frac{2}{3} \right)^{10} + \left(\frac{1}{3} \right)^{10}$$

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$$\begin{aligned} P(A_{(1)} < 5, 10 < A_{(10)}) &= 1 - (1-x)^n - y^n + (y-x)^n = 1 - \left(\frac{2}{3}\right)^{10} - \left(\frac{2}{3}\right)^{10} + \left(\frac{1}{3}\right)^{10} \\ &= 1 - \frac{1}{3^{10}}(2^{11} - 1) \end{aligned}$$

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can be solved this way using E.4.6.3, I am looking for a shortcut before finishing the solution. However 4.6.3 is scheduled two weeks before this one.