

IMM - DTU

02405 Probability

2004-4-17

BFN/bfn

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$$P(X_1 = x_1 | X_1 + X_2 = n) = \frac{\frac{\lambda_1^{x_1}}{x_1!} e^{-\lambda_1} \frac{\lambda_2^{n-x_1}}{(n-x_1)!} e^{-\lambda_2}}{\frac{(\lambda_1 + \lambda_2)^n}{n!} e^{-(\lambda_1 + \lambda_2)}}$$

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Question b) Let X_i denote the number of eggs laid by insect i .

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$$P(X_2 \leq 60) = \Phi\left(\frac{60 + \frac{1}{2} - 150 \cdot \frac{1}{2}}{\frac{1}{2}\sqrt{150}}\right)$$

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$$P(X_2 \leq 60) = \Phi\left(\frac{60 + \frac{1}{2} - 150 \cdot \frac{1}{2}}{\frac{1}{2}\sqrt{150}}\right) = \Phi\left(\frac{-29}{\sqrt{150}}\right)$$

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$$P(X_2 \leq 60) = \Phi\left(\frac{60 + \frac{1}{2} - 150 \cdot \frac{1}{2}}{\frac{1}{2}\sqrt{150}}\right) = \Phi\left(\frac{-29}{\sqrt{150}}\right) = \Phi(-2.37) = 0.0089$$