



Msc. Data Science

University of Applied Science

DLMDSAS01– Advanced Statistics

Advance Statistics Workbook

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1 Task 1: Basic Probabilities and Visualizations (1)

The number of meteorites falling on an ocean in a given year can be modelled by one of the following distributions. Give a graphic showing the probability of one, two, three... meteorites falling (until the probability remains provably less than 0.5% for any bigger number of meteorites). Calculate the expectation and median and show them graphically on this graphic

A Poisson distribution with an expectation of $\lambda = 16$

$$P(X = k) = \frac{e^{-\lambda} \lambda^k}{k!} \quad (1.1)$$

The probability that one, two, three... meteorites falling can be Calculated as $PX = 1, PX = 2, PX = 3$ until the probability remains less than 0.5%

$$P(X = 1) = \frac{e^{-16} \cdot 16^1}{1!} = 1.29517596 \times 10^{-11} \quad (1.2)$$

$$P(X = 2) = \frac{e^{-16} \cdot 16^2}{2!} = 1.84467854 \times 10^{-9} \quad (1.3)$$

$$P(X = 3) = \frac{e^{-16} \cdot 16^3}{3!} = 4.09641181 \times 10^{-8} \quad (1.4)$$

2 Task 2: Basic Probabilities and Visualizations (2)

3 Task 3: Transformed Random Variables

4 Task 4: Hypothesis Test

5 Task 5: Regularized Regression

6 Task 6: Bayesian Estimates