this joint marginal time: conditional distributions

let's compute the quantile function (inverse CDF) of the exponential distribution

\( (X | (X < \lambda) \sim \text{Exponential} (\lambda) \)

\( f_{X} (y) = \lambda e^{-\lambda y} I(y > 0) \) and

\( F_{X} (y) = (1 - e^{-\lambda y}) I(y > 0) \)

all we have to do is set \( 1 - e^{-\lambda y} = y \) and solve for \( y_{p} : 1 - y = e^{-\lambda y_{p}} \), so

\[ y_{p} = \frac{-1}{\lambda} \log (1 - y) \]

Ex. \( \lambda = 0.25 \); median of the exponential dist. with \( \lambda = 0.25 \) is \( y_{0.5} = 0.5 \) and

\[ y_{0.5} = \frac{-1}{0.25} \log (1 - 0.5) \]

turns out that mean is \( \frac{1}{\lambda} = 4 \times 0.25 = 2.77 \)
\[ F(x) = F(x) \]

\[ F_Z(y) = 1 \]

\[ F_Z(y) = \mathbb{P}(Z \leq y) \]

\[ F_Z(y) = 1 - F_Z(y) \]

\[ F_Z(y_1) = \mathbb{P}(Z \leq y_1) \]

\[ F_Z(y_2) = \mathbb{P}(Z \leq y_2) \]

\[ y_1 < y_2 \]
\[ f_2(x) \]

\[ f_3(y) \]

\[ f_{X,Y}(x,y) \]

\[ X \text{ is 1-dimensional} \]

\[ Y \text{ continuous on } (0, \infty) \]

\[ P(X = 1) = 0 \]

\[ Y = g(x) \]

\[ \text{1-dimensional} \]

\( \text{prob. 0} \)
Support of uniform dist. on the unit square

\[ P(Y = X) = 0 \]

population

*all deer living in veg on 11 Apr 2015*

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\[ N = 500 \]

\[ \text{mean } \theta = ? \]

(data → unknown(s)

(unknown) \[ \text{(prob.)} \]

\[ \text{infer } \]
goal: want A & n as similar as possible in all relevant way

method: choose A at random

pop. (whole) general
prob. easier deduction sample (path) (particular)

induction = statistical inference

statistics (harder)