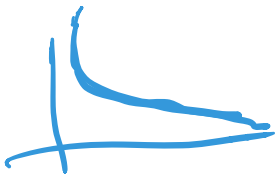
Exponential (rate = 1)

cdf: $F(x) = 1 - e^{-x}$



$F^{-1}(x)$? $\quad \alpha = 1 - e^{-x}$

$e^{-x} = 1 - \alpha$

$-x = \log(1-\alpha)$

$x = -\log(1-\alpha)$

$F^{-1}(\alpha) = -\log(1-\alpha)$

if $U \sim \text{Unif}(0,1)$

$$X = -\log(1-U)$$

$$X \sim \text{Expo}(1)$$

$$X = -\log U$$

$$1 - U \sim \text{Unif}(0,1)$$

X

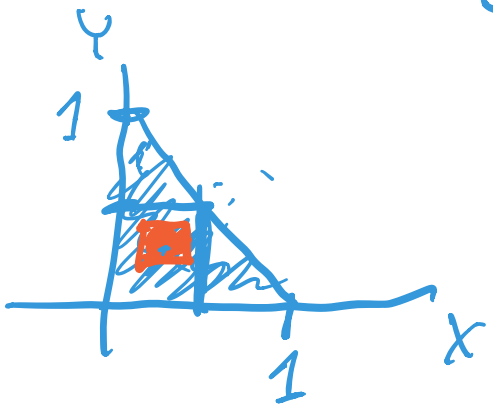
$$U = 1 - e^{-X}$$

$$U \sim \text{Unif}(0,1)$$

$U^2 \neq$ Unif

Ex Uniform over the triangle $(0,0)-(1,0)-(0,1)$

(x,y)



$(x,y) \geq 0$

$(x+y) \leq 1$

Joint PDF? Marginal? Conditional

$$1 = \int_0^1 \left(\int_0^{1-y} c \, dx \right) dy$$

$$= \int_0^1 (cx) \Big|_0^{1-y} dy$$

$\frac{\partial}{\partial y} y^2 = \frac{1}{2} y$

$$= \int_0^1 c(1-y)\, dy$$

$$= c\left(y - \tfrac{1}{2}y^2\right)\Big|_0^1 = \frac{c}{2}$$

$c = 2$

$f_{XY}(x,y) = 2 \qquad x, y \geq 0$

$x + y \leq 1$