Scipy Continuous Distribution Matrix

Distribution	MEAN	VAR	PDF	CDF
Normal ex: heights of women or heights of men are normally distributed `loc` is μ, `scale` is σ	μ	σ^2	$\frac{1}{\sqrt{2\pi\sigma^2}}e^{-\frac{(x-\mu)^2}{2\sigma^2}}$	$\frac{1}{2}\left[1+\operatorname{erf}\left(\frac{x-\mu}{\sigma\sqrt{2}}\right)\right]$
`norm_dist = scs.norm(loc=0, scale=2)` `norm_sample = scs.norm.rvs(loc=0, scale=1, size=20)`	`norm_dist.mean()`	`norm_dist.var()`	`norm_dist.pdf(x=0)`	`norm_dist.cdf(x=0)`
Uniform ex: distribution of results of die rolls `loc` is a, `scale` is $b-a$	$\frac{a+b}{2}$	$\frac{(a+b)^2}{12}$	$\frac{1}{b-a}$ for $x \in \| a, b \| 0$ otherwise	0 for $x < a$ $\frac{x-a}{b-a}$ for $x \in \| a, b$ 1 for $x \geq b$
`unif_dist = scs.uniform(loc=0, scale=10)` `unif_sample = scs.uniform.rvs(loc=0, scale=10, size=20)`	`unif_dist.mean()`	`unif_dist.var()`	`unif_dist.pdf(x=3)`	`unif_dist.cdf(x=3)`
Exponential `scale` is λ, `loc` is typically 0	λ^{-1}	λ^{-2}	$\lambda e^{-\lambda x}$	$\lambda e^{-\lambda x}$
`exp_dist = scs.expon(loc=0, scale=2)` `exp_sample = scs.expon.rvs(loc=0, scale=2, size=20)`	`exp_dist.mean()`	`exp_dist.var()`	`exp_dist.pdf(x=1)`	`exp_dist.cdf(x=1)`

Distribution	MEAN	VAR	PDF	CDF
Gamma `a` is k, `scale` is θ , `loc` is typically 0	$k\theta$	$k\theta^2$	$\frac{1}{\Gamma(k)\theta^k}x^{k-1}e^{-\frac{x}{\theta}}$	$\frac{1}{\Gamma(k)}\gamma(k, \frac{x}{\theta})$
`gam_dist = scs.gamma(a=1, loc=0, scale=2)` `gam_sample = scs.gamma.rvs(a=1, loc=0, scale=2, size=20)`	`gam_dist.mean()`	`am_dist.var()`	`gam_dist.pdf(x=3)`	`gam_dist.cdf(x=3)`

References

Mathematical equations are copied from Wikipedia.