Table (2): Continuous Distributions

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توقع

Distribution	p.d.f.	E(x)	V(x)	$M_x(t)$
Uniform $x \sim U(a,b)$	$f(x)=\begin{cases}\frac{1}{b-a} & a\le x\le b\\ 0 & 0.w\end{cases}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\frac{e^{bt}-e^{at}}{(b-a)t}$
Exponential $x \sim \mathrm{Exp}(\theta)$	$f(x)=\begin{cases}\frac{1}{\theta}e^{-\frac{x}{\theta}} & x\ge 0\\ 0 & 0.w\end{cases}$	θ	θ^2	$(1-\theta t)^{-1}$
Gamma $x \sim Gam(\alpha,\beta)$	$f(x)=\begin{cases}\frac{1}{\Gamma(\alpha)\,\beta^{\alpha}}x^{\alpha-1}e^{-\frac{x}{\beta}} & x\ge 0\\ 0 & 0.w\end{cases}$	$\alpha\beta$	$\alpha\beta^2$	$(1-\beta t)^{-\alpha}$
Chi-Square $x \sim \chi^2(r)$	$f(x)=\begin{cases}\frac{1}{2^{\frac{r}{2}}\,\Gamma(\frac{r}{2})}x^{\frac{r}{2}-1}e^{-\frac{x}{2}} & x\ge 0\\ 0 & 0.w\end{cases}$	r	$2r$	$(1-2t)^{-\frac{r}{2}}$
Beta $x \sim Beta(a,b)$ $x \sim Uni(0,1)$ If a=b=1	$f(x)=\begin{cases}\frac{1}{\beta(a,b)}x^{a-1}(1-x)^{b-1} & 0\le x\le 1\\ 0 & 0.w\end{cases}$	$\frac{a}{a+b}$	$\frac{ab}{(a+b)^2(a+b+1)}$	–
Normal $x \sim N(\mu,\sigma^2)$	$f(x)=\begin{cases}\frac{1}{\sigma\sqrt{2\pi}}e^{-\frac{1}{2}\frac{(x-\mu)^2}{\sigma^2}} & -\infty<x<\infty\\ 0 & 0.w\end{cases}$	μ	σ^2	$e^{\mu t+\frac{1}{2}\sigma^2 t^2}$

Standard Normal $x \sim N(0,1)$	$f(x) = \begin{cases} \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}z^2} & -\infty < Z < \infty \\ 0 & 0.w \end{cases}$	0	1	$e^{\frac{1}{2}t^2}$
Cauchy	$f(x) = \begin{cases} \frac{1}{\pi(1+x^2)} & -\infty < X < \infty \\ 0 & 0.w \end{cases}$	-	-	-