Table 1. Important Continuous Random Variables (Families)

	Θ	$f_X(x)$	m_X	σ_X^2	$\Phi_X(\omega)$
Uniform(a, b)	$\mathbb{R}^2$	$\frac{1}{b-a}\mathbb{1}(a < x < b)$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$	$\frac{e^{i\omega b}-e^{i\omega a}}{i\omega(b-a)}$
Exponential(λ)	$\mathbb{R}_+$	$\frac{1}{\lambda}e^{-\frac{x}{\lambda}}\mathbb{1}(x > 0)$	λ	λ^2	$\frac{\lambda}{\lambda-i\omega}$
Gaussian(μ, σ^2)	$\mathbb{R} \times \mathbb{R}_+$	$\frac{1}{\sqrt{2\pi\sigma^2}}e^{-\frac{(x-\mu)^2}{2\sigma^2}}$	μ	σ^2	$e^{i\mu\omega-\frac{\sigma^2}{2}\omega^2}$
Cauchy(μ, σ)	$\mathbb{R} \times \mathbb{R}_+$	$\frac{1}{\pi\sigma(1+(\frac{x-\mu}{\sigma})^2)}$	N/A	N/A	$e^{-\alpha\lvert\omega\rvert+i\mu\omega}$
Gamma(α, β)	$\mathbb{R}_+ \times \mathbb{R}_+$	$\frac{x^{\alpha-1}e^{-\frac{x}{\beta}}}{\Gamma(\alpha)\beta^\alpha}\mathbb{1}(x > 0)$	$\alpha\beta$	$\alpha\beta^2$	$\frac{1}{(1-i\omega\beta)^\alpha}$
Chi-Squared(k)	$\mathbb{Z}_+$	$\frac{x^{\frac{k}{2}-1}e^{-\frac{x}{2}}}{\Gamma(\frac{k}{2})2^{\frac{k}{2}}}\mathbb{1}(x > 0)$	k	$2k$	$\frac{1}{(1-2i\omega)^{\frac{k}{2}}}$
Beta(α, β)	$\mathbb{R}_+ \times \mathbb{R}_+$	$\frac{\Gamma(\alpha+\beta)}{\Gamma(\alpha)\Gamma(\beta)}x^{\alpha-1}(1-x)^{\beta-1}\mathbb{1}(0 < x < 1)$	$\frac{\alpha}{\alpha+\beta}$	$\frac{\alpha\beta}{(\alpha+\beta)^2(\alpha+\beta+1)}$	
Laplacian(α)	$\mathbb{R}_+$	$\frac{\alpha}{2}e^{-\alpha\lvert x\rvert}$	0	$\frac{2}{\alpha^2}$	$\frac{\alpha^2}{\omega^2+\alpha^2}$
Rayleigh(α)	$\mathbb{R}_+$	$\frac{x}{\alpha^2}e^{-\frac{x^2}{2\alpha^2}}\mathbb{1}(x > 0)$	$\sqrt{\frac{\pi}{2}}\alpha$	$(2-\frac{\pi}{2})\alpha^2$	
Pareto(x_m, α)	$\mathbb{R}_+ \times \mathbb{R}_+$	$\frac{\alpha x_m^\alpha}{x^{\alpha+1}}\mathbb{1}(x > x_m)$	$\frac{\alpha x_m}{\alpha-1}$ $(\alpha > 1)$	$\frac{\alpha x_m^2}{(\alpha-2)(\alpha-1)^2}$ $(\alpha > 2)$	
Lognormal(μ, σ^2)	$\mathbb{R} \times \mathbb{R}_+$	$\frac{1}{\sqrt{2\pi\sigma^2}}\frac{1}{x}e^{-\frac{(\log x-\mu)^2}{2\sigma^2}}$	$e^{\mu+\frac{\sigma^2}{2}}$	$e^{2(\mu+\sigma^2)}-e^{2\mu+\sigma^2}$	
Double Exponential(μ, σ)	$\mathbb{R} \times \mathbb{R}_+$	$\frac{1}{2\sigma}e^{-\frac{\lvert x-\mu\rvert}{\sigma}}$	μ	$2\sigma^2$	

See Leon-Garcia, P164.