Facts about standard distributions

Binomial distribution

Parameters are n and p. Range is the integers from 0 to n.

Probability mass function: $p(x) = \left(\begin{array}{c} n \\ x \end{array} \right) p^x (1-p)^{n-x}$

Mean: $E(X) = np$
Variance: $\mathrm{Var}(X) = np(1-p)$

Geometric distribution

Parameter is p. Range is the integers from 1 on up.

Probability mass function: $p(x) = p(1-p)^{x-1}$

Mean: $E(X) = 1/p$
Variance: $\mathrm{Var}(X) = (1-p)/p^2$

Negative binomial distribution

Parameters are k and p. Range is the integers from k on up.

Probability mass function: $p(x) = \left(\begin{array}{c} x-1 \\ k-1 \end{array} \right) p^k (1-p)^{x-k}$

Mean: $E(X) = k/p$
Variance: $\mathrm{Var}(X) = k(1-p)/p^2$

Poisson distribution

Parameter is μ. Range is the integers from 0 on up.

Probability mass function: $p(x) = e^{-\mu}\mu^x/x!$

Mean: $E(X) = \mu$
Variance: $\mathrm{Var}(X) = \mu$

Exponential distribution

Parameter is λ. Range is the positive real numbers.

Probability density function: $f(x) = \lambda e^{-\lambda x}$

Mean: $E(X) = 1/\lambda$
Variance: $\mathrm{Var}(X) = 1/\lambda^2$

Normal distribution

Parameters are μ and σ. Range is the real numbers.

Probability density function: $f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-(x-\mu)^2/2\sigma^2}$

Mean: $E(X) = \mu$
Variance: $\mathrm{Var}(X) = \sigma^2$