Probability Density Functions (PDF's) for Advanced Statistics with Topics

Binomial Distribution

If $X \sim B(n, p)$, then $P(x = k) = \binom{n}{k} p^k (1-p)^{n-k}$.

Geometric Distribution

If $X \sim G(p)$, then $P(x = k) = (1-p)^{k-1} p$.

Normal Distribution

If $X \sim N(\mu, \sigma)$, then $N(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$.

***t* Distribution**

If X has a t distribution with d degrees of freedom, then $t(x) = \frac{\left(\frac{d-1}{2}\right)!}{\sqrt{d\pi}\left(\frac{d-2}{2}\right)!\left(1+\frac{x^2}{d}\right)^{\left(\frac{d+1}{2}\right)}}$.

χ^2 - Distribution

If X has a χ^2 distribution with d degrees of freedom, then $c(x) = \frac{e^{-\frac{x}{2}} x^{\left(\frac{d-2}{2}\right)}}{\left(\frac{d-2}{2}\right)! 2^{\frac{d}{2}}}$

***F*- Distribution**

If X has an F distribution with d_1 and d_2 degrees of freedom, then

$$F(x) = \frac{\left(\frac{d_1+d_2-2}{2}\right)!}{\left(\frac{d_1-2}{2}\right)!\left(\frac{d_2-2}{2}\right)!} \cdot \left(\frac{d_1}{d_2}\right)^{\frac{d_1}{2}} \cdot \frac{x^{\left(\frac{d_1-2}{2}\right)}}{\left(1+\frac{d_1 \cdot x}{d_2}\right)^{\left(\frac{d_1+d_2}{2}\right)}}$$