STAT 500

χ^2 Distribution Information

- Definition: A continuous random variable W has a χ^2 distribution with ν degrees of freedom if the density function can be expressed as:

$$f(w) = \frac{w^{\nu/2-1}e^{-w/2}}{2^{\nu/2}\Gamma(\nu/2)} \qquad w > 0$$

- The parameter of the χ^2 distribution is the number of degrees of freedom ν.
- The mean of a χ^2 distribution is $E(W) = \nu$ and the variance is $V(W) = 2\nu$.
- The shape of a χ^2 distribution is unimodal and right skewed. As the number of degrees of freedom increases, the shape becomes more symmetric and bell-shaped.
- Below is a picture of the density function for the χ^2 distribution.