

χ^2 distribution.

The following definition of the χ^2 -distributed random variable can be extended.

For our purposes:

Let Z_1, Z_2, \dots, Z_r be independent, standard normal r.v.s.
Define:

$$X = Z_1^2 + Z_2^2 + \dots + Z_r^2$$

We say that X has the χ^2 -distribution w/

(r) degrees of freedom (parameter)

We write: $X \sim \chi^2(\underline{df=r})$

ν "nu"

Example. Let $X \sim \chi^2(df=5)$.

Find $TP[1.145 \leq X \leq 12.83] = ?$

$$\begin{aligned} \rightarrow: TP[X \leq 12.83] - TP[X \leq 1.145] &= \\ &= F_X(12.83) - F_X(1.145) \end{aligned}$$

1st Tables: $0.975 - 0.05 = 0.925$ w

2nd R: $pchisq(12.83, df=5) - pchisq(1.145, df=5)$
 $= 0.9250188$