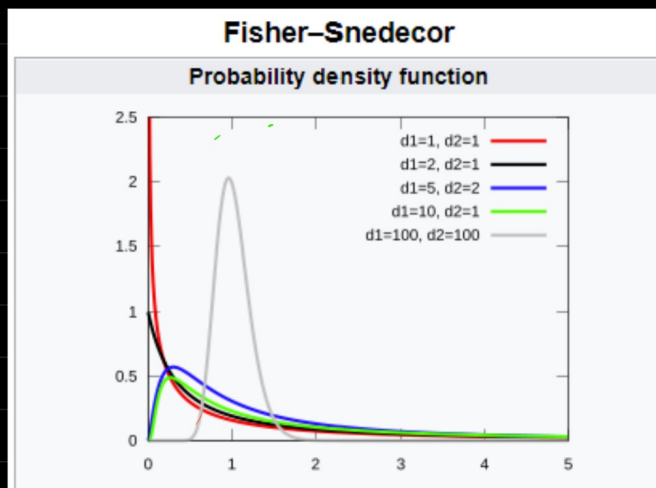## F-distribution (Fisher - Snedecor dist)

→ The F-distribution is a probability distribution that is useful in the context of comparing variances of two or more sample.

→ It is right skewed and takes only non negative values.

$$f(x; d_1, d_2) = \frac{\sqrt{\frac{(d_1 x)^{d_1} d_2^{d_2}}{(d_1 x + d_2)^{d_1 + d_2}}}}{x B\left(\frac{d_1}{2}, \frac{d_2}{2}\right)}$$ → Beta function

$$= \frac{1}{B\left(\frac{d_1}{2}, \frac{d_2}{2}\right)} \left(\frac{d_1}{d_2}\right)^{\frac{d_1}{2}} x^{\frac{d_1}{2}-1} \left(1 + \frac{d_1}{d_2} x\right)^{-\frac{d_1 + d_2}{2}}$$

Pdf of F dist^n

Fisher–Snedecor
Probability density function

$dof = s \cdot s - 1$

→ The F dist^n with d_1 & d_2 (degree of freedom) is the the distribution of x given by $x = \dfrac{S_1/d_1}{S_2/d_2}$

where S_1 & S_2 are independent random variables with Chi-square distribution, d_1 & d_2 degree of freedom

F statistics $= \dfrac{S_1^2}{S_2^2}$

(variance ration test)

$\sigma =$ population std
$S -$ sample standard dev^n

Observations
→ Since S_1^2 & S_2^2 is there, its a non-negative distribution
→ As dof1 & dof2 is $\geqslant 30$, the F dist^n behaves approximately

like a normal distribution.

like a distribution.