Excel Functions for the F Distribution

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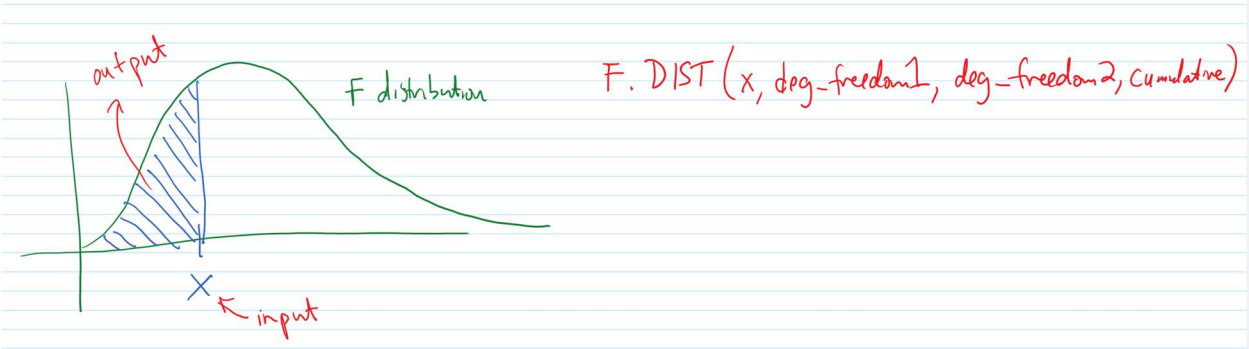
NOTE: The **.DIST** versions of each of the functions below will output probability as a function of percentage points (the "x-value", in other words) of the distribution. The **.INV** versions will output the x-value corresponding to probability. Most are left-tailed formulas and some are right-tailed formulas (usually indicated with a **.RT** at the end).

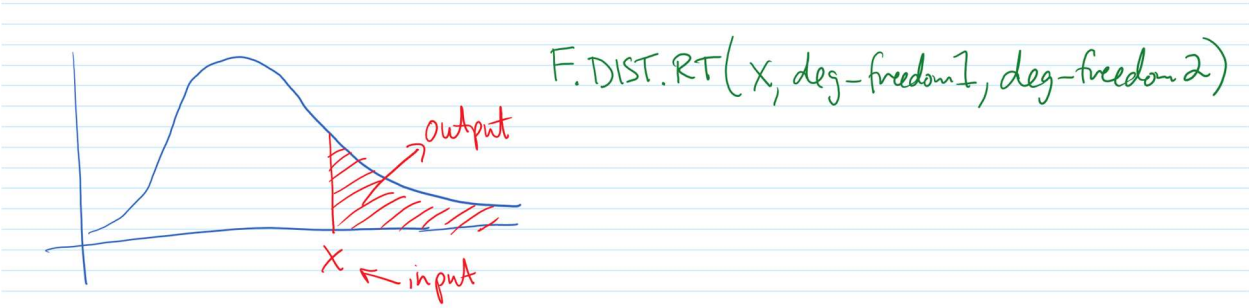
F DISTRIBUTION

F.DIST(x,deg_freedom1,deg_freedom2,cumulative) – Given a value of **x** on the F distribution with numerator degrees of freedom **deg_freedom1** and **deg_freedom2** degrees of freedom in the denominator, this function outputs the cumulative (if **cumulative** = **TRUE**) left-tailed distribution up to **x**. If **cumulative = FALSE**, this function outputs the probability density function of the distribution.



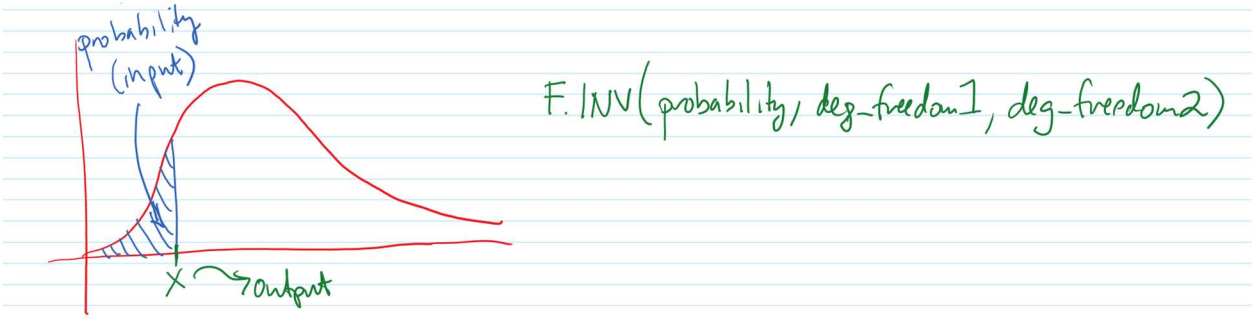
Example: The area to the left of x = 1 on the F distribution with numerator degrees of freedom equal to 7 and denominator degrees of freedom equal to 9 is: **=F.DIST(1,7,9,TRUE)** = 0.512

F.DIST.RT(x,deg_freedom1,deg_freedom2) – Outputs the right-tailed probability (area) under the F distribution with **deg_freedom1** degrees of freedom in the numerator and **deg_freedom2** degrees of freedom in the denominator.



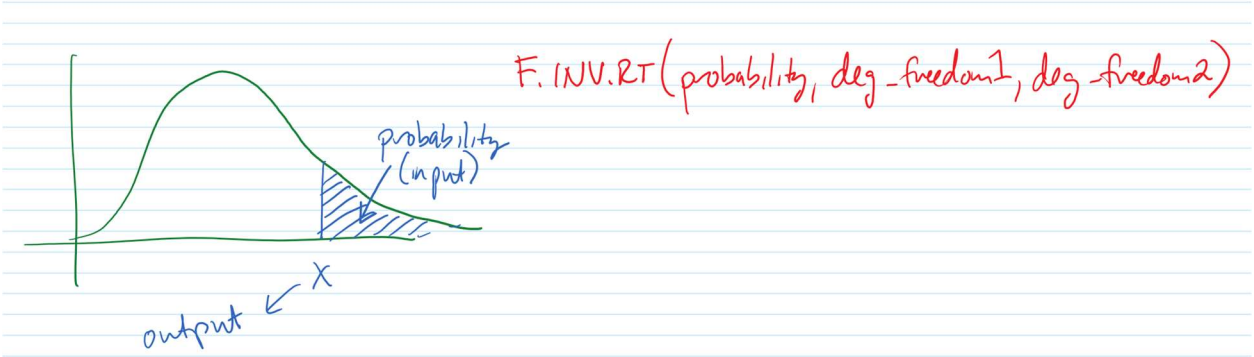
Example: The area to the right of x = 2.5 under the F distribution with 12 numerator degrees of freedom and 8 denominator degrees of freedom is: **=F.DIST.RT(2.5,12,8)** = 0.100

F.INV(probability,deg_freedom1,deg_freedom2) – Returns the x-value of the F distribution with **deg_freedom1** numerator degrees of freedom and **deg_freedom2** denominator degrees of freedom that has **probability** area to the left of it.



Example: The x-value of the F distribution with 4 numerator degrees of freedom and 7 denominator degrees of freedom that has 20% of the distribution to the left of it is: **=F.INV(0.2,4,7)** = 0.405

F.INV.RT(probability,deg_freedom1,deg_freedom2) – Returns the x-value of the F distribution with **deg_freedom1** numerator degrees of freedom and **deg_freedom2** denominator degrees of freedom that has **probability** area to the right of it. The **F.INV.RT** function is useful for calculating percentage points of the F distribution (see "Percentage Points of the F Distribution on the course website).



Example: The x-value of the F distribution with 12 degrees of freedom in the numerator and 15 degrees of freedom in the denominator that has 5% of the distribution to the right of it is: **=F.INV.RT(0.05,12,15)** = 2.48

Percentage Points of the F Distribution

In setting up confidence intervals and hypothesis tests on the ratio of two variances, we need to determine the parameter(s) $f_{\alpha,u,v}$, $f_{1-\alpha,u,v}$, $f_{\alpha/2,u,v}$, and/or $f_{1-\alpha/2,u,v}$. These can also be obtained in the "Percentage Points of the F Distribution" tables that are on the course website or using Excel functions.

In order to calculate these "percentage points" of the F distribution in Excel, we can use the **F.INV** and **F.INV.RT** functions in Excel, shown here for 6 numerator degrees of freedom and 9 denominator degrees of freedom.

$f_{\alpha,u,v}$ **=F.INV.RT(alpha,6,9)**

$f_{1-\alpha,u,v}$ **=F.INV.RT(1-alpha,6,9)** [note that this is also equivalent to **F.INV(alpha,6,9)**]

$f_{\alpha/2,u,v}$ **=F.INV.RT(alpha/2,6,9)**

$f_{1-\alpha/2,u,v}$ **=F.INV.RT(1-alpha/2,6,9)** [note that this is also equivalent to **F.INV(alpha/2,6,9)**]