STATA can be used to make probability calculations for the t-model, using the commands `ttail` and `invttail`. This can be used to obtain critical values for confidence intervals and hypothesis tests, as well as p-values.

If you know the value $t^*$ and want to calculate the area above it under the t-model with $df$ degrees of freedom (shown in gray), use the command `ttail(df, t*)`.

If you know the area in gray, $\alpha$ (e.g. 5%), and want to calculate $t^*$, you should instead use the command `invttail(df, alpha)`.

**Ex. 1** Suppose you want to calculate the critical value of $t$ for a 90% confidence interval with 17 degrees of freedom, i.e. you want to find the value of $t^*$ for which 5% of the area under the curve lies above $t^*$ and 5% lies below $-t^*$.

To find this value using STATA type:

```
.display invttail(17,0.05)
```

in the STATA command window.

This gives us the 95th percentile of the t-model with 17 degrees of freedom, which corresponds to the critical value for a 90% confidence interval. In the Results window the value 1.7396067 is shown (Compare this value with the one given by the table in the back of the book).

**Ex. 2** Suppose we want to find the p-value for $t \geq 2.09$ with 4 degrees of freedom.

To find this value using STATA type:

```
.display ttail(4,2.09)
```

in the STATA command window. This gives us the value 0.05241536, which corresponds to our p-value.
Note that the p-value for $t \leq 2.09$ (the area to the left of 2.09) with 4 degrees of freedom, would be given by

\[ \text{display 1-ttail(4,2.09)} \]

The p-value for $|t| \geq 2.09$ (two-sided test) with 4 degrees of freedom, would be given by

\[ \text{display 2*ttail(4,2.09)} \]

**HOMEWORK:**

Q1. Do problem 23.2 in the textbook.