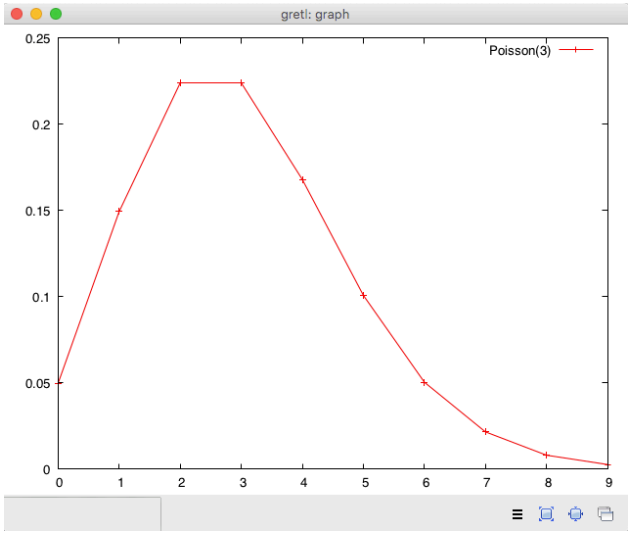
Probability in Gretl

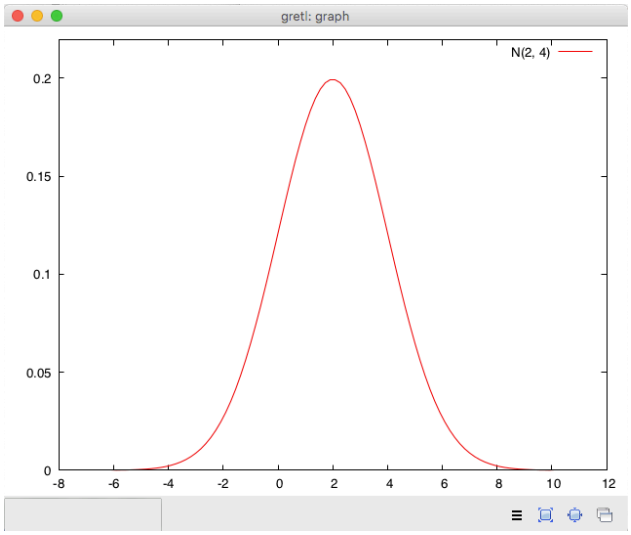
Probability distributions

The “Tools” menu provides several functionalities on probability and statistics. To draw a graph of probability distribution or cumulative distribution, you can choose

> Tools > Distributions graphs >

and then choose a distribution and specify parameters. For example, a Poisson distribution with mean 3 and a normal distribution of mean 2 and variance 4 are shown below.





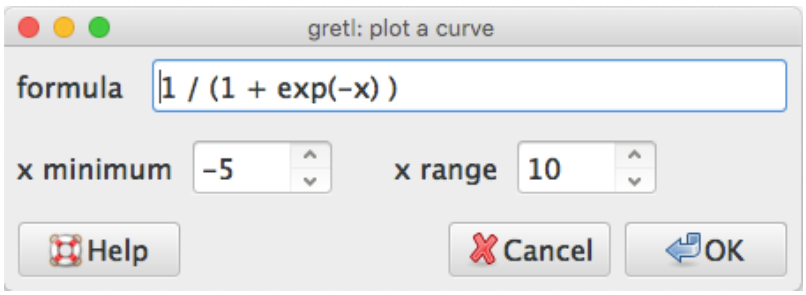
Note that for a discrete distribution, the probability distribution function is plotted as a polygon rather than a bar plot. For a normal distribution, you need to give the standard deviation instead of the variance.

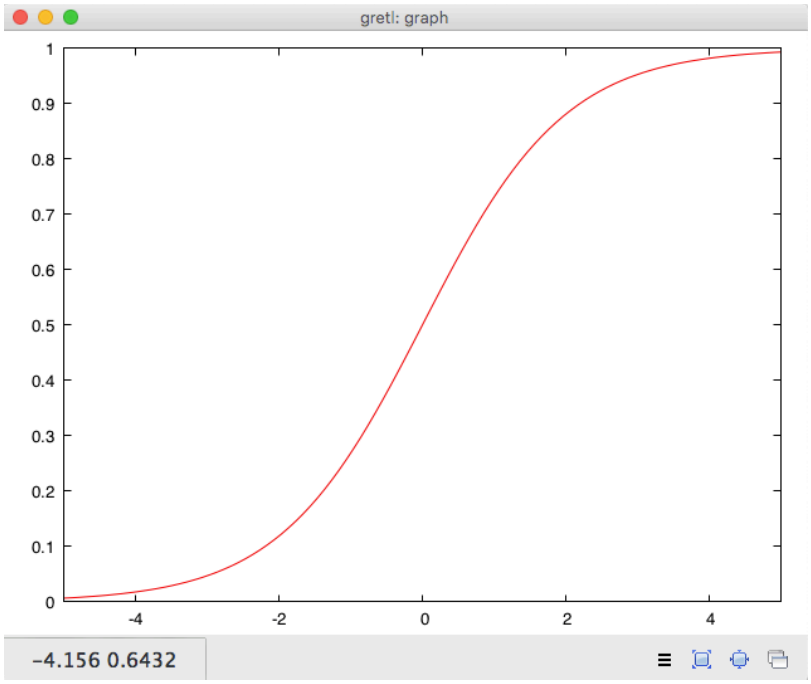
You can also plot any user defined function using

> Tools > Plot a curve >

Let us try the logistic function

$$y = \frac{1}{1 + e^{-x}} .$$





The command “exp(-x)” in the figure above means the exponential function of -x. The available mathematical functions in gretl can be found from

> Help > Function reference > Mathematical

Random numbers, histogram, mean, and variance

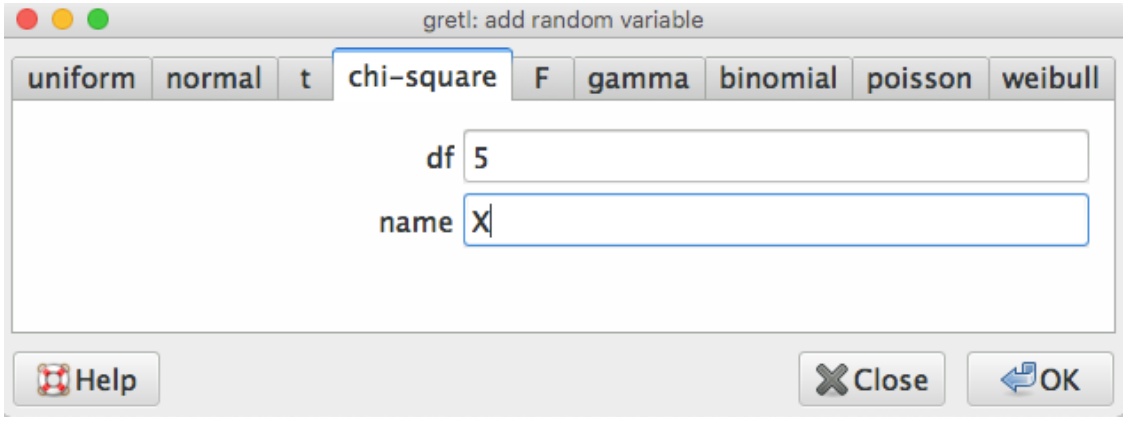
You can generate a series of random numbers following some distribution. Select

> File > New data set

to create an empty data set, and then add a random variable by choosing

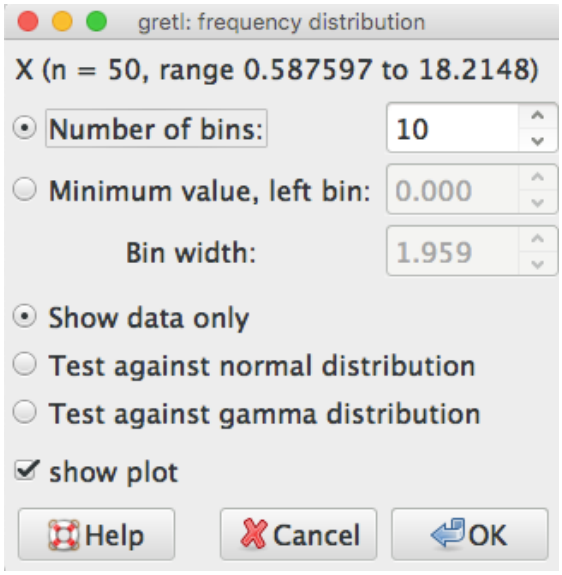
> Add > Random variable …

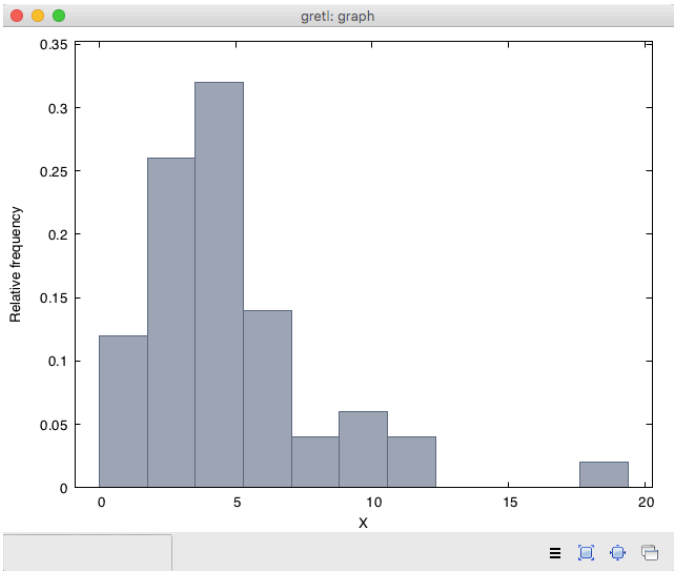
As a practice, generate 50 observations of Chi-square distribution with 5 degrees of freedom, and save as X.

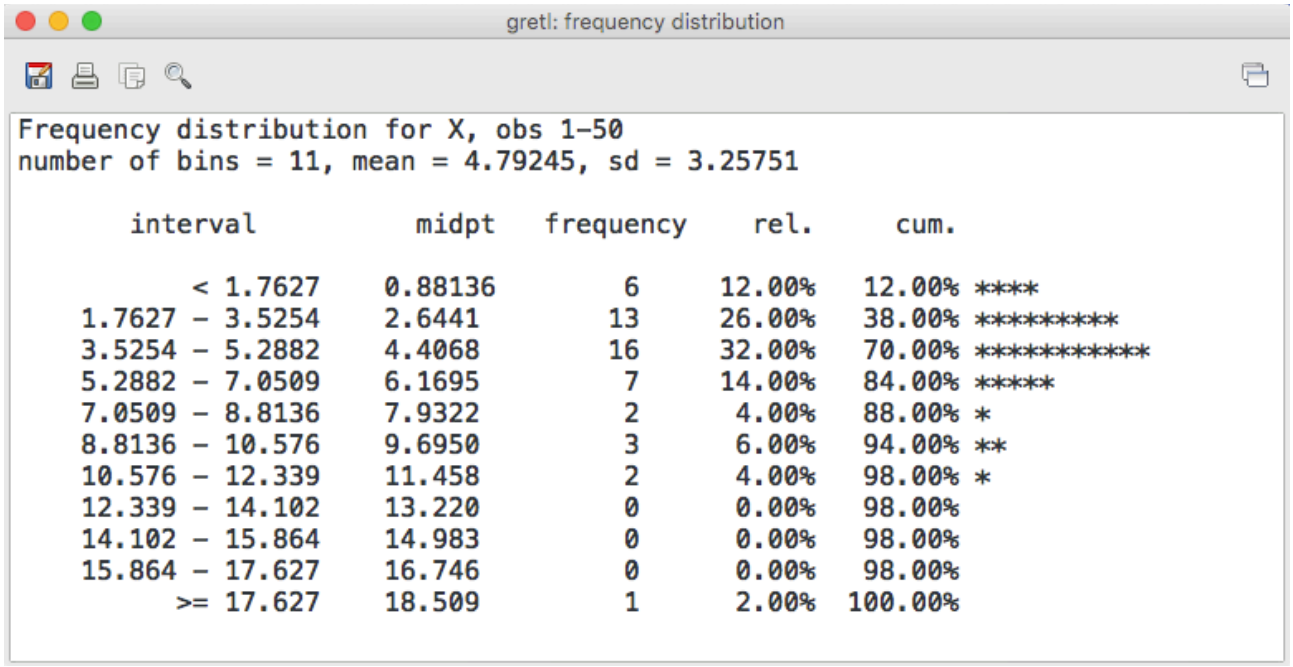


You can find variable X from the main window. The histogram of this variable can be generated from

> Variable > Frequency distribution …

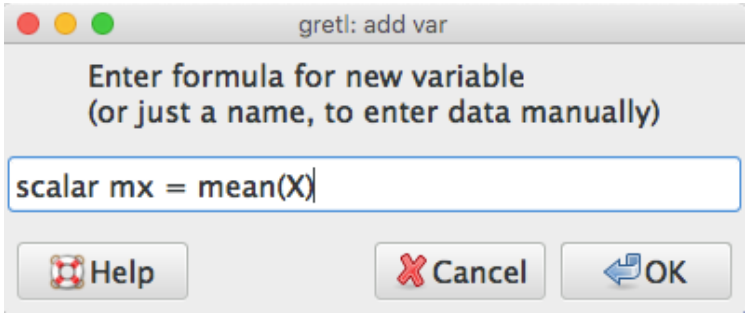




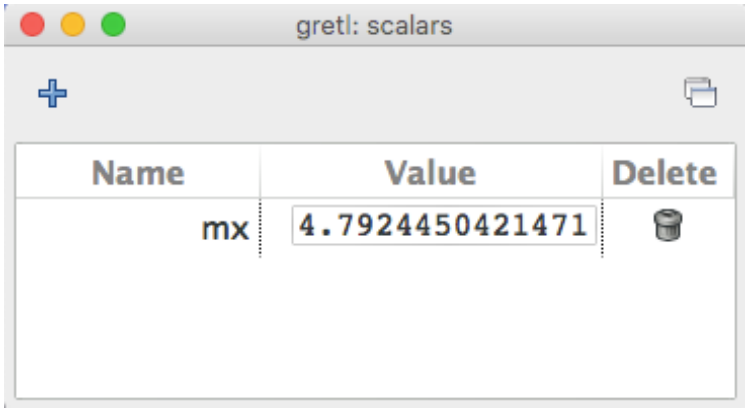


You can also calculate sample statistics from observations via adding variables. The following steps show how to find the sample mean of X.

> Add > Define new variable …



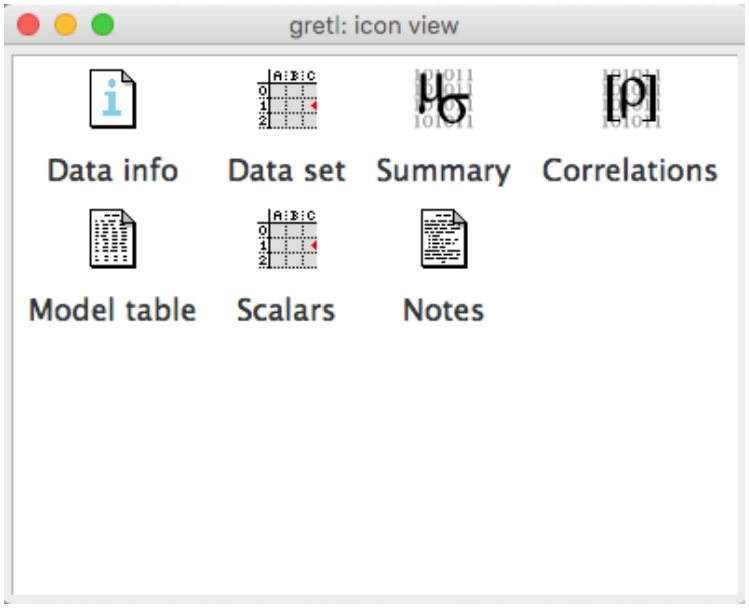
Here the command “mean(X)” returns the sample mean of X, “mx” is the name of variable, and “scalar” means it is a single number rather than a series of observations. The result is



If you close this window, you may want to know how to open it again. By choosing

> View > Icon view

you will see the following window,



then you can reopen the previous window by clicking “Scalars”.

Exercise. Calculate the variance of X and save it as “vx”. Compare the value with the theoretical variance.