distrACTION

Version 1.0.0

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distrACTION is a jamovi (www.jamovi.org) module for calculating and plotting the cumulative distribution function and the quantile function (inverse cumulative distribution function) for a number of discrete and continuous distributions.

distrACTION can be installed from within the jamovi program using the '+' sign in the right upper corner of the jamovi window.

Content

Statistical Distributions

So far, the module contains the following continuous and discrete distributions:

- Continuous distributions:
  - Normal distribution
  - T-Distribution
  - χ^2-Distribution
  - F-Distribution
- Discrete distributions:
  - Binomial Distributions

Parameters

Every distribution contains a number of parameters to set for its calculation. Non-centrality parameters (λ) are also included.

Continuous Distributions			
Normal-Distribution	Mean	SD	
T-Distribution	df	λ	
χ^2-Distribution	df	λ	
F-Distribution	df_1	df_2	λ
Discrete Distributions			
Binomial	Size	Probability	

Modes

There are three modes available in distrACTION:

- **Plot**: Creates a plot of the distribution with the chosen parameters.
  ⇨ This runs automatically and cannot be turned off.
- **Compute probability**: Calculates the lower-tail or upper-tail probability for a given x value or the probability for an $[x_1, x_2]$ interval.
- **Compute quantile(s)**: Calculates the quantile(s) (x-value(s)) for a given cumulative or central interval probability.

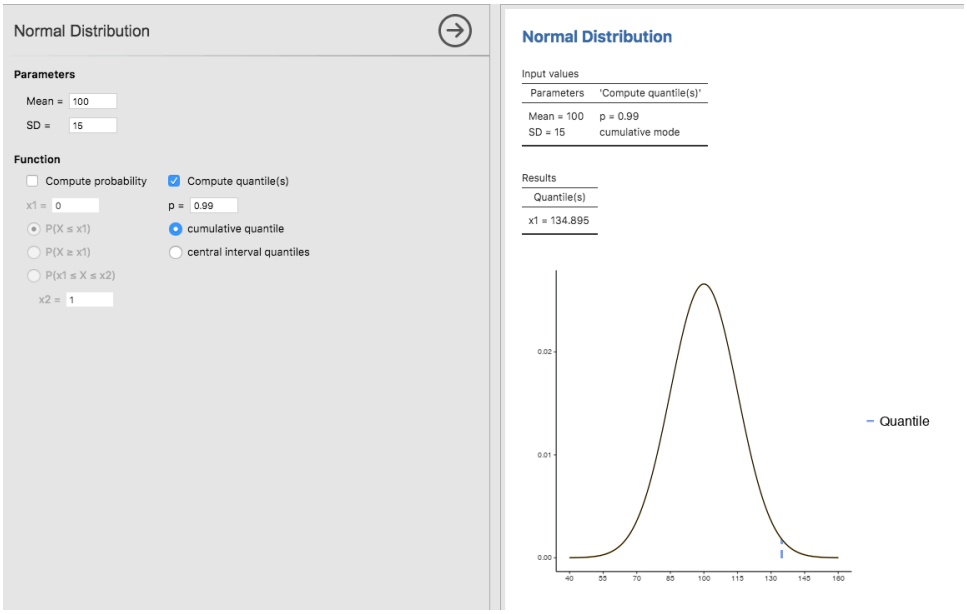
Some sub-functions are not included in every distribution type:

	Compute probability				*Compute quantile(s)*	
Distribution	P (X ≤ x1)	P (X ≥ x1)	P (x1 ≤ X ≤ x2)	P (X = x1)	Cumulative	Central interval
Normal	✓	✓	✓		✓	✓
T	✓	✓	✓		✓	✓
χ^2	✓	✓	✓		✓	
F	✓	✓	✓		✓	
Binomial	✓	✓	✓	✓	✓	✓

Example

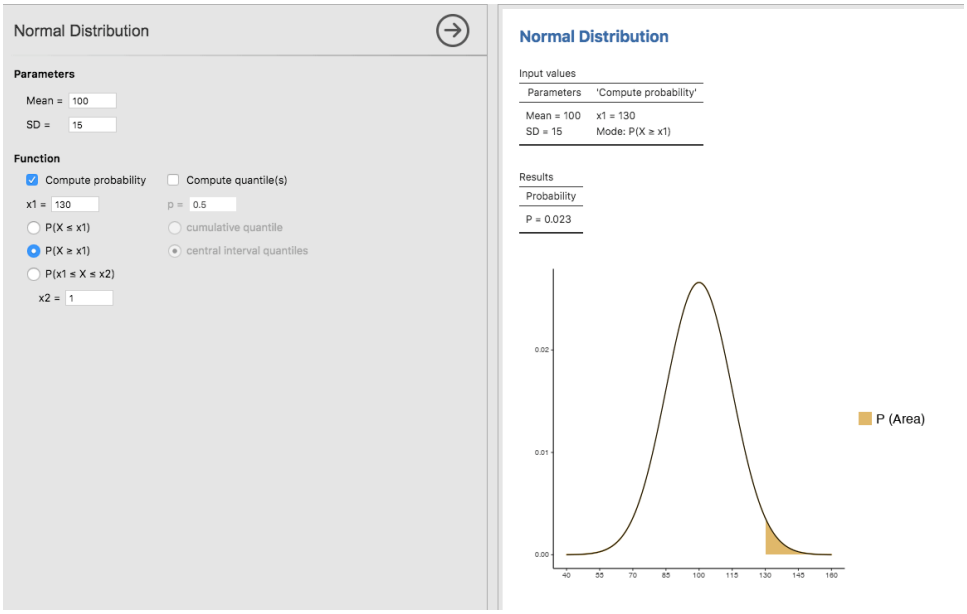
Phil's IQ – An illustrative example with the Normal Distribution

Phil claims to have an IQ of 130. Because he is so smart, he claims to know that only 1% of the population has a higher IQ than himself. Thanks to the distrACTION module, Phil's argument can now be checked without much effort.
A normal distribution with a mean value of 100 and a standard deviation of 15 is used to check Phil's statement. The cumulative 99% quantile is then calculated.



As can now be seen, the IQ of the smartest 1% is ≥134,895. This is higher than Phil's IQ.

The probability function even shows that 2.3% of a population do have an IQ of at least 130:



It is also possible to compare Phil's IQ of 130 with the 99% quantile within the same plot. This plot can then be exported and sent to Phil to show him his error: