PDdelta

Basic Summary
This function is 1-CDF where CDF is the usual cumulative distribution function obtained by integrating the probability from negative infinity to the value for absolute differences separated by “deltax” through binning.

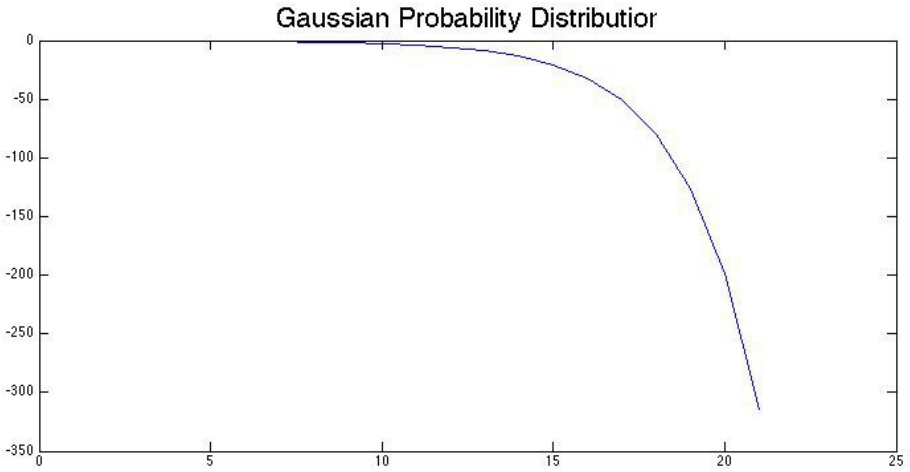
Inputs
There are five inputs: “field”, “bins”, “comp”, “deltax”, and “fitregime”. “field” represents the data 1D series that will be evaluated. “bins” is the number of histogram bins for each unit of the data. “deltax” is the separation between differences in the field. Finally, “fitregime” specifies the number of extreme points used to estimate qD.

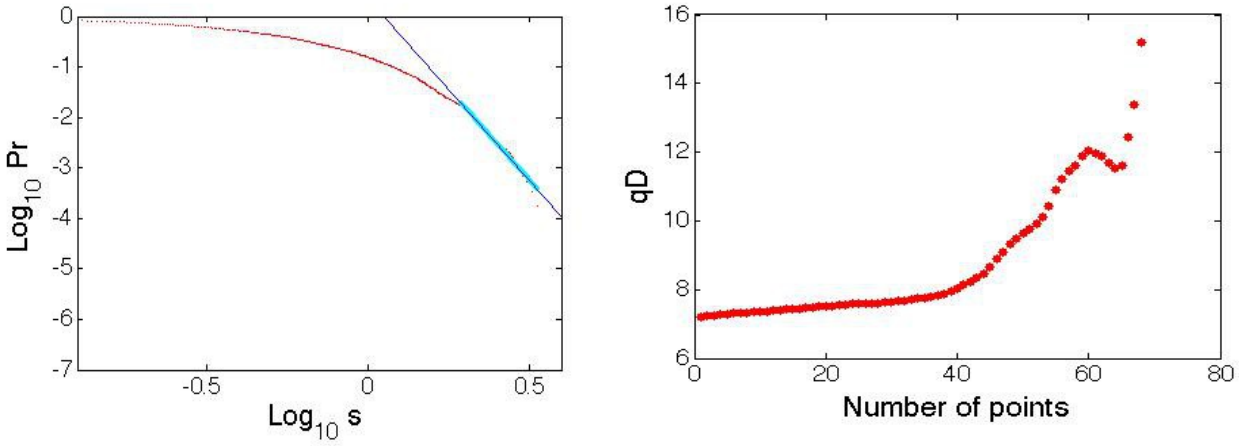
Outputs
The outputs are values of the maximum difference, standard deviation, ratio, Gaussian probability, amplification of the probability of the extreme value, and qD and three graphs. The first graph is that of the Gaussian probability distribution, the second is of the value obtained (qD) as a function of the number of extreme points used, and the last is a graph of log(Pr) vs. log(s) (probability graph).

Note: This function requires Tally and SortTally

Example
Input: “field”=Etemp (1x5788 array of temperature data from EPICA ice core)
“bins”=200
“deltax”=1
“fitregime”=70

Output: 'maximum difference'	[5.4600]
'standard deviation'	[0.8081]
'ratio'	[12.0028]
'Gauss probability'	[3.4335e-33]
'Amp. of prob. of ext. value'	[5.0319e+28]
'qD'	[68x1 double]





Note: If the qD graph is relatively flat (insensitive to the number of extreme points) then the qD estimate is reliable. Values of qD greater than ~9-10 are probably not reliable

Aside

The standard deviation of the series is 0.8081, meaning the most extreme value has a Gaussian probability of ~10^{-33} of occurring (this estimate assumes that positive and negative fluctuations have the same probability distribution) . This is obviously not a Gaussian distribution.

Errors

Subscript indices must either be real positive integers or logicals.
Error in Pddelta (line 32)
en=probval(:,leng+1:length(probval));

- This error occurs when the number of bins is too small

Undefined function or variable "qD"
Error in Pddelta (line 43)
plot(1:length(qD),qD,'r.')

- This error occurs when "fitregime" is below 2