

You will need to install and `load` the Mpfr package to run the functions `in` this Workspace

In this workspace there is a `function GIG_help`, which may be used to obtain help on the user functions, which are `GIGpdf`, `GIGcdf`, `GIGquant`, `plotGIGpdf`, `plotGIGcdf`, `GNIGpdf`, `GNIGcdf`, `GNIGquant`, `plotGNIGpdf`, `plotGNIGcdf`

```
> GIG_help(GIGpdf)
*****
* ==> GIGpdf(r,l,z,prec,prec) <==*
* Computes values of the GIG pdf
* arguments are (first 5 are mandatory):
*   r - list of integer shape parameters for the GNIG distribution
*   l - list of rate parameters for the GNIG distribution
*   z - value where the pdf is to be computed
*   prec - optional argument that indicates the number of precision digits
*          for computations (default value: 50)
*   precp - optional argument that indicates the number of digits for
*          printing the result (default value: 20)
*****
> GIGpdf(c(7,4,6),c(3.4,1.2,5.6),4.6)
0.16898659825321382267
> GIGpdf(c(7,4,6),c(3.4,1.2,5.6),4.6,,30)
0.168986598253213822668320246907
> GIGpdf(c(7,4,6),c(3.4,1.2,5.6),4.6,,55)
0.1689865982532138226683202469067962498636429438084936650

> # All user functions, while they give a printed value, they also compute
> # a value which may be stored;
> # this value is a multiple precision value, with 'prec' precision digits
> value<-GIGpdf(c(7,4,6),c(3.4,1.2,5.6),4.6)
0.16898659825321382267
> value
An object of class "mpfr"
[[1]]
'mpfrl' 0.168986598253213822668320246906796249863642943808494

> # If the required printing number of digits exceeds the number of precision digits
> # for computations, the last digits that exceed this value are in general not correct
> GIGpdf(c(7,4,6),c(3.4,1.2,5.6),4.6,60,55)
0.1689865982532138226683202469067962498636429438084813297
> GIGpdf(c(7,4,6),c(3.4,1.2,5.6),4.6,,50)
0.16898659825321382266832024690679624986364294380849

> GIG_help(GIGcdf)
*****
* ==> GIGcdf(r,l,z,prec,prec) <==*
* Computes values of the GIG cdf
* arguments are (first 5 are mandatory):
*   r - list of integer shape parameters for the GNIG distribution
*   l - list of rate parameters for the GNIG distribution
*   z - value where the pdf is to be computed
*   prec - optional argument that indicates the number of precision digits
*          for computations (default value: 50)
*   precp - optional argument that indicates the number of digits for
*          printing the result (default value: 20)
*****
> GIGcdf(c(7,4,6),c(3.4,1.2,5.6),4.6)
0.15350064945980118787
> GIGcdf(c(7,4,6),c(3.4,1.2,5.6),14.6)
0.99913058737075271510
> GIGcdf(c(7,4,6),c(3.4,1.2,5.6),15.6)
0.99966234713089948863
> GIGcdf(c(7,4,6),c(3.4,1.2,5.6),25.6)
0.99999998750072964845
> GIGcdf(c(7,4,6),c(3.4,1.2,5.6),55.6)
1.00000000000000000000000000000000
> GIGcdf(c(7,4,6),c(3.4,1.2,5.6),55.6,,50)
0.9999999999999999999996185377757127161136115034726

> GIG_help(plotGIGpdf)
*****
```



```

> q05<-GIGquant(c(7,4,6),c(3.4,1.2,5.6),.05,3,10^-25)
  3.793759455501378662762956
> q05
An object of class "mpfr"
[[1]]
'mpfr1' 3.79375945550137866276295641301684711310738303722864

> q05<-GIGquant(c(7,4,6),c(3.4,1.2,5.6),.05,3,10^-25,100)
  3.793759455501378662762956
> q05
An object of class "mpfr"
[[1]]
'mpfr1'
3.79375945550137866276295641301684711310738303722515973098152040841420473758940723608841607506
241489

> GIGcdf(c(7,4,6),c(3.4,1.2,5.6),q05,,50)
  0.050000000000000000000000000000000000000000000000000000000344
> # Several parameters may slightly affect the precision of the quantiles
> # of course the value of eps does, but also the initial value given and the
> # required computing precision, although these last two will in general
> # have a very slight effect

> GIG_help(GNIGpdf)
*****
* ==> GNIGpdf(r,ro,l,lo,z,prec,precp) <===
* Computes values of the GNIG pdf
* arguments are (first 5 are mandatory):
*   r - list of integer shape parameters for the GNIG distribution
*   ro - non-integer shape parameter
*   l - list of rate parameters corresponding to the integer shape parameters
*   lo - rate parameter corresponding to the non-integer shape parameter
*   z - value where the pdf is to be computed
*   prec - optional argument that indicates the number of precision digits
*         for computations (default value: 50)
*   precp - optional argument that indicates the number of digits for
*         printing the result (default value: 20)
*****
> GNIGpdf(c(7,4,6),5.6,c(3.4,1.2,5.6),4.8,4.6)
  0.060513926134947235470
> GNIGpdf(c(7,4,6),5.6,c(3.4,1.2,5.6),4.8,4.6,,30)
  0.0605139261349472354700402981119
> GNIGpdf(c(7,4,6),5.6,c(3.4,1.2,5.6),4.8,4.6,60,55)
  0.06051392613494723547004029811187270191036986315462832261
> GNIGpdf(c(7,4,6),5.6,c(3.4,1.2,5.6),4.8,4.6,,50)
  0.060513926134947235470040298111872701910291495463928
> # Computations for the GNIG distribution are quite heavy and quite tough
> # and as such, some of the last digits in the computation, for a given
> # value of precision digits for computations, may be not precise enough;
> # anyway, giving a large value for prec, will get a more precise value
>

> GIG_help(GNIGcdf)
*****
* ==> GNIGcdf(r,ro,l,lo,z,prec,precp) <===
* Computes values of the GNIG cdf
* arguments are (first 5 are mandatory):
*   r - list of integer shape parameters for the GNIG distribution
*   ro - non-integer shape parameter
*   l - list of rate parameters corresponding to the integer shape parameters
*   lo - rate parameter corresponding to the non-integer shape parameter
*   z - value where the pdf is to be computed
*   prec - optional argument that indicates the number of precision digits
*         for computations (default value: 50)
*   precp - optional argument that indicates the number of digits for
*         printing the result (default value: 20)
*****
> GNIGcdf(c(7,4,6),5.6,c(3.4,1.2,5.6),4.8,4.6)
  0.033737765820166216771
> GNIGcdf(c(7,4,6),5.6,c(3.4,1.2,5.6),4.8,4.6,,30)
  0.0337377658201662167710882990179
> GNIGcdf(c(7,4,6),5.6,c(3.4,1.2,5.6),4.8,4.6,,50)
  0.033737765820166216771088299017891187918886021421138

```


