

NAG Toolbox for MATLAB

g01ah

1 Purpose

g01ah performs a Normal probability plot on a character printing device, with a chosen number of character positions in each direction.

2 Syntax

```
[work, xsort, xbar, xstd, ifail] = g01ah(x, nstepx, nstepy, istand,
lwork, 'nobs', nobs)
```

3 Description

In a Normal probability plot, the data (x) are plotted against Normal scores (y). The degree of linearity in the resultant plot provides a visual indication of the Normality of distribution of a set of residuals from some fitting process, such as multiple regression.

The data values are sorted into descending order prior to plotting, and may also be standardized to zero mean and unit standard deviation, if requested.

The plot is produced on a character printing device, using a chosen number of character positions in each direction. The output is directed to the current advisory message unit number. This number may be changed by an appropriate call to x04ab before calling g01ah.

Axes are drawn and annotated and data points are plotted on the nearest character position. An appropriate step size for each axis is computed from the list

$(0.1, 0.15, 0.2, 0.25, 0.4, 0.5, 0.6, 0.75, 0.8) \times \text{power of } 10.$

Points are plotted using the digits 1 to 9 to indicate the equivalent number of observations at a particular character position, a letter A–Z for 10 – 35 occurrences, or * if there are 36 or more coincident occurrences. Zero axes are marked if included in the plotting area.

4 References

None.

5 Parameters

5.1 Compulsory Input Parameters

- 1: **x(nobs)** – double array

The vector of data values.

Constraint: all data values must not be equal.

- 2: **nstepx** – int32 scalar

The number of steps (character positions) to be plotted in the x -direction. If the supplied value of **nstepx** is less than 10, the value 10 will be used by g01ah. The maximum value for **nstepx** is the number of character positions available on the chosen output device less 15, up to a maximum of 133. If **nstepx** exceeds 133 on input, the value 133 will be used by the function.

- 3: **nstepy** – int32 scalar

The number of steps (character positions) to be plotted in the y -direction. If the supplied value of **nstepy** is less than 10, the value 10 will be used by g01ah. There is no maximum value for **nstepy**,

but you should bear in mind that $(\mathbf{nstepy} + 5)$ records (lines) of output are generated by the function.

4: **istand** – int32 scalar

Indicates whether the residuals are to be standardized prior to plotting.

If **istand** > 0, the elements of **x** are standardized to zero mean and unit standard deviation.

5: **lwork** – int32 scalar

Constraint: **lwork** $\geq (5 \times \mathbf{nobs})/2$.

5.2 Optional Input Parameters

1: **nobs** – int32 scalar

Default: The dimension of the arrays **x**, **xsrt**. (An error is raised if these dimensions are not equal.)

the number of data values.

Constraint: **nobs** ≥ 2 .

5.3 Input Parameters Omitted from the MATLAB Interface

iwork

5.4 Output Parameters

1: **work(lwork)** – double array

The first **nobs** elements of **work** contain the Normal scores in ascending magnitude. The rest of the array is used as workspace.

2: **xsrt(nobs)** – double array

The data values, sorted into descending order, and standardized if **istand** was positive on entry.

3: **xbar** – double scalar

The mean of the data values.

4: **xstd** – double scalar

The standard deviation of the data values.

5: **ifail** – int32 scalar

0 unless the function detects an error (see Section 6).

6 Error Indicators and Warnings

Errors or warnings detected by the function:

ifail = 1

On entry, **nobs** < 2.

ifail = 2

All the supplied data values are equal.

