

NAG Toolbox for MATLAB

g01ag

1 Purpose

g01ag performs a scatter plot of two variables on a character printing device, with a chosen number of character positions in each direction.

2 Syntax

```
[y, isort, ifail] = g01ag(x, y, nstepx, nstepy, 'nobs', nobs)
```

3 Description

g01ag finds the range of the data in each dimension and calculates a step size for each division on the axes; these step sizes are selected from the list

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

The axes are drawn and annotated and data points are plotted on the nearest character position. The character plotted is either a digit 1 to 9 for the equivalent number of occurrences of a point at a particular character position, an alphabetic A–Z for 10 – 35 occurrences, or * if there are more than 35 coincident occurrences. Axes are drawn on all sides of the plot with the left-hand and bottom ones annotated; zero axes are also marked if included in the plotting area.

The Fortran logical unit number used for the output is the current advisory message unit number defined for each implementation. This number may be changed by an appropriate call to x04ab before calling g01ag.

4 References

None.

5 Parameters

5.1 Compulsory Input Parameters

- 1: **x(nobs) – double array**

The values to be plotted in the x -direction.

- 2: **y(nobs) – double array**

The values to be plotted in the y -direction.

- 3: **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 g01ag. 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.

- 4: **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 g01ag. There is no maximum value for **nstepy**, but you should bear in mind that $(\text{nstepy} + 5)$ records (lines) of output are generated by the function.

5.2 Optional Input Parameters

1: **nobs** – int32 scalar

Default: The dimension of the arrays **x**, **y**. (An error is raised if these dimensions are not equal.)
the number of observations to be plotted.

Constraint: **nobs** ≥ 1 .

5.3 Input Parameters Omitted from the MATLAB Interface

None.

5.4 Output Parameters

1: **y(nobs)** – double array

The elements of **y** are sorted into descending order of magnitude.

2: **isort(nobs)** – int32 array

The key to the descending order of the elements in array **y**, i.e., **isort**(*i*) contains the position of the value **y**(*i*) in the original array **y**, for $i = 1, 2, \dots, \mathbf{nobs}$.

3: **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** < 1.

7 Accuracy

Accuracy is limited by the number of plotting points available.

8 Further Comments

The time taken by g01ag may be expected to be approximately proportional to the product **nobs** $\times$ **nstepx** $\times$ **nstepy**.

No blank records are output before or after the plot.

You must make sure that it is permissible to write records containing **nstepx** characters to the current advisory message unit.

9 Example

```
x = [16;
      16;
      16.4;
      20.5;
      18.3;
      16.3;
      17.7;
      15.3;
      16.5;
```

```

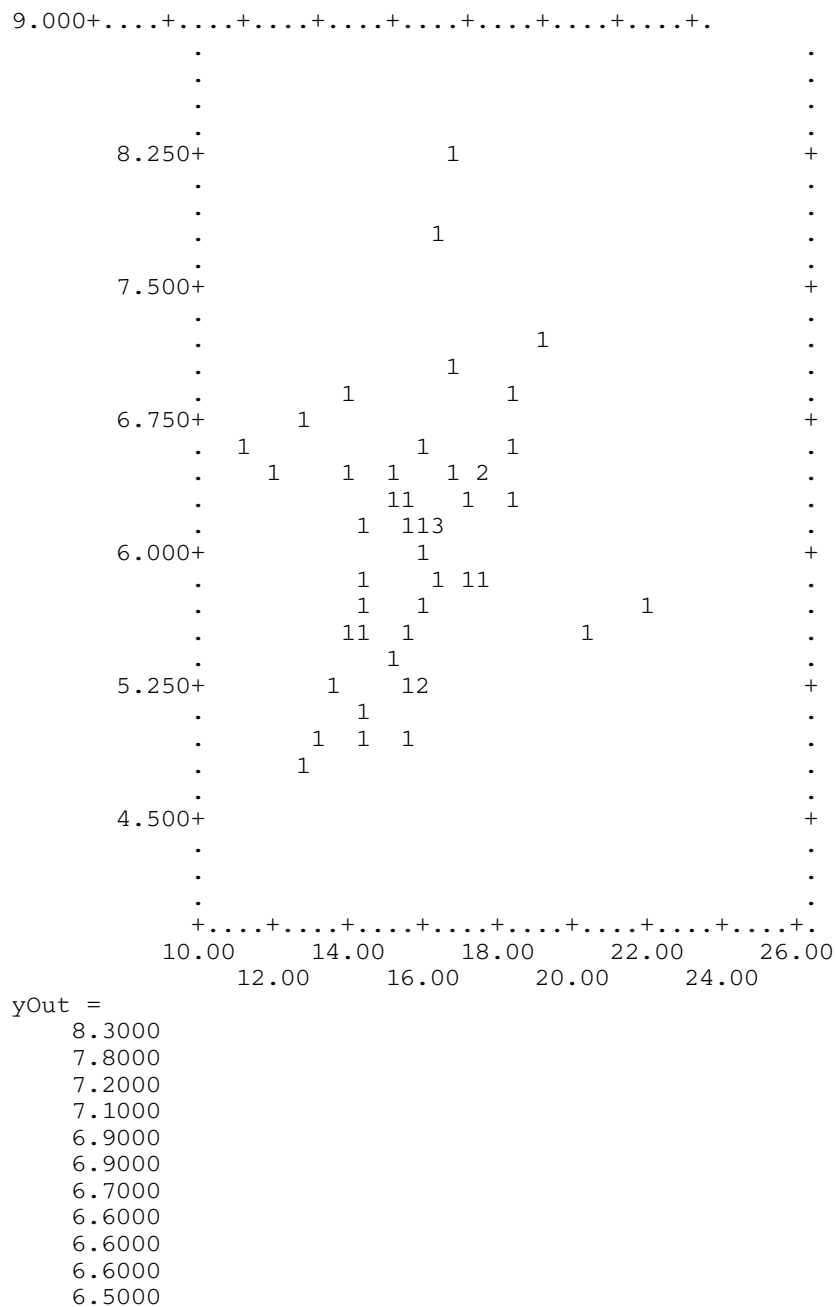
16.9;
21.9;
15.5;
15.9;
16.1;
18.5;
12.7;
15.7;
14.3;
13.9;
12.8;
12;
15.6;
15.9;
16.7;
14.3;
14.4;
15.2;
14.1;
15.5;
16.5;
14.3;
13.2;
13.9;
14.4;
13.5;
11.2;
14.4;
15.5;
18.5;
16.4;
17.1;
16.9;
17.5;
15.9;
19.2;
17.7;
15.2;
17.1];
y = [5.3;
6.6;
6.1;
5.5;
6.9;
6.1;
6.4;
6.3;
7.8;
8.300000000000001;
5.7;
6.2;
6;
6.1;
6.6;
4.8;
4.9;
5.1;
5.5;
6.7;
6.5;
5.2;
5.2;
7.1;
4.9;
5.6;
6.4;
6.9;
5.6;
6.1;
5.7;

```

```

5;
6.5;
6.2;
5.2;
6.6;
5.8;
6.3;
6.3;
5.8;
5.9;
6.5;
5.8;
5.7;
7.2;
6.5;
5.4;
6.3];
nstepx = int32(40);
nstepy = int32(32);
[yOut, isort, ifail] = g01ag(x, y, nstepx, nstepy)

```



```
6.5000
6.5000
6.5000
6.4000
6.4000
6.3000
6.3000
6.3000
6.3000
6.2000
6.2000
6.1000
6.1000
6.1000
6.1000
6.0000
5.9000
5.8000
5.8000
5.8000
5.7000
5.7000
5.7000
5.6000
5.6000
5.5000
5.5000
5.4000
5.3000
5.2000
5.2000
5.2000
5.1000
5.0000
4.9000
4.9000
4.8000
isort =
      10
       9
      45
      24
       5
      28
      20
       2
      15
      36
      21
      33
      42
      46
       7
      27
       8
      38
      39
      48
      12
      34
       3
       6
      14
      30
      13
      41
      37
      40
      43
      11
```

```

        31
        44
        26
        29
         4
        19
        47
         1
        22
        23
        35
        18
        32
        17
        25
        16
ifail =
         0
```
