

NAG Toolbox for MATLAB

g11sb

1 Purpose

g11sb is a service function which may be used prior to calling g11sa to calculate the frequency distribution of a set of dichotomous score patterns.

2 Syntax

```
[ns, x, irl, ifail] = g11sb(n, x, 'ip', ip)
```

3 Description

When each of n individuals responds to each of p dichotomous variables the data assumes the form of the matrix X defined below

$$X = \begin{bmatrix} x_{11} & x_{12} & \cdots & x_{1p} \\ x_{21} & x_{22} & \cdots & x_{2p} \\ \vdots & \vdots & & \vdots \\ x_{n1} & x_{n2} & \cdots & x_{np} \end{bmatrix} = \begin{bmatrix} \underline{x}'_1 \\ \underline{x}'_2 \\ \vdots \\ \underline{x}'_n \end{bmatrix},$$

where the x take the value of 0 or 1 and $\underline{x}_l = (x_{l1}, x_{l2}, \dots, x_{lp})'$, for $l = 1, 2, \dots, n$ denotes the score pattern of the l th individual ($\prime$ denoting the transpose of a vector). g11sb calculates the number of different score patterns, s , and the frequency with which each occurs. This information can then be passed to g11sa.

4 References

None.

5 Parameters

5.1 Compulsory Input Parameters

1: **n – int32 scalar**

n , the number of individuals in the sample.

Constraint: $n \geq 7$.

2: **x(ldx,ip) – logical array**

ldx, the first dimension of the array, must be at least **n**.

$x(i,j)$ must be set equal to **true** if $x_{ij} = 1$, and **false** if $x_{ij} = 0$, for $i = 1, 2, \dots, n$ and $j = 1, 2, \dots, p$.

5.2 Optional Input Parameters

1: **ip – int32 scalar**

Default: The dimension of the array **x**.

p , the number of dichotomous variables.

Constraint: $ip \geq 3$.

5.3 Input Parameters Omitted from the MATLAB Interface

ldx

5.4 Output Parameters

- 1: **ns** – **int32 scalar**
The number of different score patterns, s .
- 2: **x(ldx,ip)** – **logical array**
The first s rows of **x** contain the s different score patterns.
- 3: **irl(n)** – **int32 array**
The frequency with which the l th row of **x** occurs, for $l = 1, 2, \dots, s$.
- 4: **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, **ip** < 3,
or **n** < 7,
or **ldx** < **n**.

7 Accuracy

Exact.

8 Further Comments

The time taken by g11sb is small and increases with n .

9 Example

```
n = int32(10);
x = [false, false, false;
     false, true, false;
     true, true, true;
     false, false, false;
     false, false, true;
     false, false, false;
     false, false, false;
     true, true, false;
     false, false, true;
     false, true, true];
[ns, xOut, irl, ifail] = g11sb(n, x)
```

```
ns =
      6
xOut =
      0      0      0
      0      1      0
      1      1      1
      0      0      1
      1      1      0
      0      1      1
      0      0      0
      1      1      0
```

	0	0	1
	0	1	1
irl =			
		4	
		1	
		1	
		2	
		1	
		1	
		0	
		1	
		0	
		1	
ifail =			
		0	