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Multinomial Random Numbers

Subroutine subprogram RNMNML generates a vector of random integers $n_i > 0\,(i = 1, 2, \ldots, N)$ with probabilities p_i according to the multinomial distribution

$$Prob(n_1, n_2, \ldots, n_N) = \frac{(n_1 + n_2 + \cdots + n_N)!}{n_1!\, n_2! \cdots n_N!}\, p_1^{n_1}\, p_2^{n_2} \cdots p_N^{n_N} .$$

Structure:

SUBROUTINE subprogram
User Entry Names: RNMNML
External References: RANLUX (V115)

Usage:

```
CALL RNMNML(N,NSUM,PCUM,NVEC,IERR)
```

N (INTEGER) Number N of random integers n_i requested.

NSUM (INTEGER) $\sum_{i=1}^{N} n_i$, specified by the user.

PCUM (REAL) One-dimensional array of length $\geq$ N. Must contains, on entry, the (normalized) cumulative channel probabilities $\sum_{j=1}^{i} p_j$ in PCUM(i) (i = 1, . . . , N). In particular, PCUM(N) = 1.

NVEC (INTEGER) One-dimensional array of length $\geq$ N. On exit, NVEC(i), (i = 1, ... ,N) contains the generated random integers.

IERR Error flag.
= 0 : Normal case,
= 1 : PCUM(i) < PCUM(i − 1) for one i al least,
= 2 : PCUM(N) ≠ 1.

Notes:

For $N = 2$, use RNBNML (V137).

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