NAME

e872_random - interface routines to the E872 random number generation routines

SYNOPSIS (C)

```
#include <e872_random.h>

float  e872_breitwigner(void);
float  e872_gaussian(void);
float  e872_random(void);
int    e872_ranseed(void *x);

#define E872_RANDOM_SYSTEM      (1)
#define E872_RANDOM_CERN        (2)
#define E872_RANDOM_LINUXK      (3)

% cc foo.c -L/opt/e872/utils/lib -le872_random_system -lm

% cc foo.c -L/opt/e872/utils/lib -le872_random_cern -lm

% cc foo.c -L/opt/e872/utils/lib -le872_random_linuxk -lm
```

SYNOPSIS (FORTRAN)

```
#include <e872_random.inc>

real      e872_breitwigner
real      e872_gaussian
real      e872_random
integer   e872_ranseed

external  e872_breitwigner
external  e872_gaussian
external  e872_random
external  e872_ranseed

parameter(e872_random_system=1)
parameter(e872_random_cern=2)
parameter(e872_random_linuxk=3)

% f77 bar.f -L/opt/e872/utils/lib -le872_random_system -lm
```

OVERVIEW

The **e872_random_*** libraries consist of collections of routines for generating proper sequences of random numbers for the E872 Monte Carlo code.

The function calls to the random-number generating routines are consistent across the various **e872_random_*** libraries, and have the forms shown in the **synopsis** above. This standard interface allows different random-number generating routines to be used without changing source code.

DESCRIPTION

The **e872_breitwigner()** function returns a random number between positive and negative infinity with a the Breit-Wigner frequency distribution (mean = 0.0, full width at half-maximum = 1.0).

The **e872_gaussian()** function returns a random number between positive and negative infinity with a gaussian (normal) frequency distribution (mean=0.0, standard deviation=1.0).

The **e872_random()** function returns a random number between 0 and 1 with a uniform frequency distribution. The returned number is strictly greater than zero and less than 1.

The **e872_ranseed()** function is a library-dependent function used to initalize and save the random-number seed used by the library. Since this varies greatly from library to library, the invocation form of this function has been kept very general.

The integer value returned by **e872_ranseed()** should agree with the library, as defined in e872_random.h, e.g. the **e872_ranseed()** function in the libe872_random_system.a library should return the value 1 (E872_RANDOM_SYSTEM, as defined in e872_random.h).

Further information about the proper arguments to **e872_ranseed()** should be located in the documentation for the specific library.

FILES

/opt/e872/utils/include/e872_random.h
: The **e872_random** C header file, which defines prototypes that apply to all of the libraries

/opt/e872/utils/lib/libe872_random_system.a
: The **e872_random** object library that uses calls to system routines

/opt/e872/utils/lib/libe872_random_cern.a
: The **e872_random** object library that uses calls to CERNLIB routines

/opt/e872/utils/lib/libe872_random_linuxk.a
: The **e872_random** object library that uses calls to the random-number facilities of the Linux kernel

CAVEATS

Linking this library into FORTRAN executables can be a touchy operation. For instance, the GNU FORTRAN compiler

g77 requires the "-fno-second-underscore" argument to properly find routines that have an underscore in their names. Also note that any FORTRAN compiler worth its salt permits use of the C preprocessor (see cpp(1) or cccp(1)). The GNU FORTRAN compiler g77 permits use of the argument "-x f77-cpp-input" to accomplish this end.

MISCELLANEOUS

Linking to the math library is necessary because of the trigonometric functions often called by random number generating routines.

SEE ALSO

e872_random_system(3), e872_random_cern(3C,3F), e872_random_linuxk(3)

AUTHOR

John Trammell <trammell@fnal.gov> University of Minnesota