

# Oracle® Cloud

## Licensing Information User Manual for Oracle Spatial AI



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# Preface

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes
2.2.1	2.2	2002	PSF	yes
2.2.2	2.2.1	2002	PSF	yes
2.2.3	2.2.2	2003	PSF	yes
2.3	2.2.2	2002-2003	PSF	yes
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2.3.2	2.3.1	2002-2003	PSF	yes
2.3.3	2.3.2	2002-2003	PSF	yes
2.3.4	2.3.3	2004	PSF	yes
2.3.5	2.3.4	2005	PSF	yes
2.4	2.3	2004	PSF	yes
2.4.1	2.4	2005	PSF	yes

2.4.2	2.4.1	2005	PSF	yes
2.4.3	2.4.2	2006	PSF	yes
2.4.4	2.4.3	2006	PSF	yes
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2.5.1	2.5	2007	PSF	yes
2.5.2	2.5.1	2008	PSF	yes
2.5.3	2.5.2	2008	PSF	yes
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2.6.2	2.6.1	2009	PSF	yes
2.6.3	2.6.2	2009	PSF	yes
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cmake/modules/3.\* (backported CMake find modules)

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Assignee: Esri.

Assignors/Inventors: Maurer, Thomas (Redlands, CA); Gao, Peng (Redlands, CA); Becker, Peter (Redlands, CA).

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Name: SFC64

Adapted from a C++ implementation of Chris Doty-Humphrey's SFC PRNG.

<https://gist.github.com/imneme/flf7821f07cf76504a97f6537c818083>

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Original algorithm for the implementation of `rk_interval` function from  
Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by  
Magnus Jonsson.

Constants used in the `rk_double` implementation by Isaku Wada.

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Original algorithm for the implementation of `rk_interval` function from Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by Magnus Jonsson.

Constants used in the `rk_double` implementation by Isaku Wada.

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David H. Munro wrote Yorick and Gist. Berkeley Yacc (byacc) generated the Yorick parser. The routines in Math are from LAPACK and FFTPACK; MathC contains C translations by David H. Munro. The algorithms for Yorick's random number generator and several special functions in Yorick/include were taken from Numerical Recipes by Press, et. al., although the Yorick implementations are unrelated to those in Numerical Recipes. A small amount of code in Gist was adapted from the X11R4 release, copyright M.I.T. -- the complete copyright notice may be found in the (unused) file Gist/host.c.

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Chris Colbert began the Kiwi project in December 2013 in an effort to create a blisteringly fast UI constraint solver. Chris is still the project lead.

The Nucleic Development Team is the set of all contributors to the Nucleic project and its subprojects.

The core team that coordinates development on GitHub can be found here: <http://github.com/nucleic>. The current team consists of:

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certify
```

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This package contains a modified version of ca-bundle.crt:

```
ca-bundle.crt -- Bundle of CA Root Certificates
```

```
Certificate data from Mozilla as of: Thu Nov  3 19:04:19 2011#
This is a bundle of X.509 certificates of public Certificate Authorities
(CA). These were automatically extracted from Mozilla's root certificates
file (certdata.txt). This file can be found in the mozilla source tree:
https://hg.mozilla.org/mozilla-central/file/tip/security/nss/lib/ckfw/builtins/
certdata.txt
It contains the certificates in PEM format and therefore
can be directly used with curl / libcurl / php_curl, or with
an Apache+mod_ssl webserver for SSL client authentication.
Just configure this file as the SSLCertificateFile.#
```

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```
@(#) $RCSfile: certdata.txt,v $ $Revision: 1.80 $ $Date: 2011/11/03 15:11:58 $
```

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```

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```

```
click-plugins
```

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alg/thinplatespline.cpp  
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IEEE754 log() code derived from:  
@(#)e\_log.c 1.3 95/01/18

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alg/libqhull  
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Arlington, MA

and

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frmts/pdf/pdfdataset.cpp (method PDFiumRenderPageBitmap())  
-----

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frmts/mrf/\* (apply when MRF driver included in build)



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cmake/modules/3.\* (backported CMake find modules)  
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ogr/ogrsf\_frmts/flatgeobuf

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FlatGeobuf  
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ogr/ogrsf\_frmts/flatgeobuf/flatbuffers

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Assignors/Inventors: Maurer, Thomas (Redlands, CA); Gao, Peng (Redlands, CA); Becker,  
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

Release	Derived from	Year	Owner	GPL-compatible? (1)
0.9.0 thru 1.2		1991-1995	CWI	yes
1.3 thru 1.5.2	1.2	1995-1999	CNRI	yes
1.6	1.5.2	2000	CNRI	no
2.0	1.6	2000	BeOpen.com	no
1.6.1	1.6	2001	CNRI	yes (2)
2.1	2.0+1.6.1	2001	PSF	no
2.0.1	2.0+1.6.1	2001	PSF	yes
2.1.1	2.1+2.0.1	2001	PSF	yes
2.2	2.1.1	2001	PSF	yes
2.1.2	2.1.1	2002	PSF	yes
2.1.3	2.1.2	2002	PSF	yes

2.2.1	2.2	2002	PSF	yes
2.2.2	2.2.1	2002	PSF	yes
2.2.3	2.2.2	2003	PSF	yes
2.3	2.2.2	2002-2003	PSF	yes
2.3.1	2.3	2002-2003	PSF	yes
2.3.2	2.3.1	2002-2003	PSF	yes
2.3.3	2.3.2	2002-2003	PSF	yes
2.3.4	2.3.3	2004	PSF	yes
2.3.5	2.3.4	2005	PSF	yes
2.4	2.3	2004	PSF	yes
2.4.1	2.4	2005	PSF	yes
2.4.2	2.4.1	2005	PSF	yes
2.4.3	2.4.2	2006	PSF	yes
2.4.4	2.4.3	2006	PSF	yes
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2.6.5	2.6.4	2010	PSF	yes
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```
== sfc64 (embedded)
## The MIT License
```

Adapted from a C++ implementation of Chris Doty-Humphrey's SFC PRNG.

<https://gist.github.com/imneme/flf7821f07cf76504a97f6537c818083>

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```
== splitmix64 (embedded)
Written in 2015 by Sebastiano Vigna (vigna@acm.org)
```

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```

```
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pytz
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```

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idna
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```
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Functions for testing global optimizers, forked from the AMPGO project,  
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```
== biasedurn
```

```
----- Forwarded message -----
```

From: Agner Fog <agner@agner.org>

Date: Wed, Jul 22, 2020 at 8:54 PM

Subject: Re: Add BiasedUrn to SciPy?

To: Matt Haberland <mhaberland@calpoly.edu>

Cc: Warren Weckesser <warren.weckesser@gmail.com>

Dear Matt The C++ code for these distributions without binding to the R project are available here:

<https://www.agner.org/random/stocc.zip>

You have my permission to use it in SciPy under the new BSD license.

Best regards,

Agner Fog

On 22/07/2020 17.05, Matt Haberland wrote:

Hi Agner, I'm a maintainer of the Python scientific computing library SciPy, and I'm working on improving the capabilities of our statistics subpackage `scipy.stats`. We'd like to add both Fisher's and Wallenius' noncentral hypergeometric distributions, but these look quite challenging to implement. We found your `BiasedUrn` package, and we'd love to wrap it, but we can't include GPL-3 licensed code under our BSD-new license. Would you consider re-licensing `BiasedUrn` under a more permissive license, such as BSD-new or MIT, so we can include it in SciPy? Thank you for considering it!

Matt

--

Matt Haberland  
Assistant Professor  
BioResource and Agricultural Engineering  
08A-3K, Cal Poly

==uru.ran

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unuran-1.8.1/aclocal.m4
unuran-1.8.1/autoconf/config.guess
unuran-1.8.1/autoconf/config.sub
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unuran-1.8.1/autoconf/install-sh
unuran-1.8.1/autoconf/ltmain.sh
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unuran-1.8.1/doc/src/arvag.dh  
unuran-1.8.1/doc/src/error\_debug.dh  
unuran-1.8.1/doc/src/examples.dh  
unuran-1.8.1/doc/src/glossary.dh  
unuran-1.8.1/doc/src/index.dh  
unuran-1.8.1/doc/src/installation.dh  
unuran-1.8.1/doc/src/intro.dh  
unuran-1.8.1/doc/src/make\_texi.pl  
unuran-1.8.1/doc/src/methods.dh  
unuran-1.8.1/doc/src/methods\_cemp.texi  
unuran-1.8.1/doc/src/methods\_cont.texi  
unuran-1.8.1/doc/src/methods\_cvec.texi  
unuran-1.8.1/doc/src/methods\_cvemp.texi  
unuran-1.8.1/doc/src/methods\_discr.texi  
unuran-1.8.1/doc/src/methods\_matr.texi  
unuran-1.8.1/doc/src/methods\_mcmc.texi  
unuran-1.8.1/doc/src/misc.dh  
unuran-1.8.1/doc/src/ref\_example0.texi  
unuran-1.8.1/doc/src/ref\_example0\_str.texi  
unuran-1.8.1/doc/src/ref\_example1.texi  
unuran-1.8.1/doc/src/ref\_example1\_str.texi  
unuran-1.8.1/doc/src/ref\_example2.texi  
unuran-1.8.1/doc/src/ref\_example2\_str.texi  
unuran-1.8.1/doc/src/ref\_example3.texi  
unuran-1.8.1/doc/src/ref\_example3\_str.texi  
unuran-1.8.1/doc/src/ref\_example\_FuncStr.texi  
unuran-1.8.1/doc/src/ref\_example\_anti.texi  
unuran-1.8.1/doc/src/ref\_example\_anti\_str.texi  
unuran-1.8.1/doc/src/ref\_example\_cext.texi  
unuran-1.8.1/doc/src/ref\_example\_cont.texi  
unuran-1.8.1/doc/src/ref\_example\_cont\_str.texi  
unuran-1.8.1/doc/src/ref\_example\_dext.texi  
unuran-1.8.1/doc/src/ref\_example\_discr.texi  
unuran-1.8.1/doc/src/ref\_example\_discr\_str.texi  
unuran-1.8.1/doc/src/ref\_example\_emp.texi  
unuran-1.8.1/doc/src/ref\_example\_emp\_str.texi  
unuran-1.8.1/doc/src/ref\_example\_gsl.texi  
unuran-1.8.1/doc/src/ref\_example\_mixt.texi  
unuran-1.8.1/doc/src/ref\_example\_mixt\_inv.texi  
unuran-1.8.1/doc/src/ref\_example\_rngstreams.texi  
unuran-1.8.1/doc/src/ref\_example\_vemp.texi  
unuran-1.8.1/doc/src/ref\_example\_win32\_1.texi  
unuran-1.8.1/doc/src/ref\_example\_win32\_2.texi  
unuran-1.8.1/doc/src/references.dh  
unuran-1.8.1/doc/src/stddist.dh  
unuran-1.8.1/doc/src/texinfo.tex  
unuran-1.8.1/doc/src/top.dh  
unuran-1.8.1/doc/src/unuran\_src.texi  
unuran-1.8.1/doc/stamp-1  
unuran-1.8.1/doc/stamp-vti  
unuran-1.8.1/doc/unuran.html  
unuran-1.8.1/doc/unuran.info  
unuran-1.8.1/doc/unuran.pdf  
unuran-1.8.1/doc/unuran.texi  
unuran-1.8.1/doc/unuran.txt  
unuran-1.8.1/doc/unuran\_win32.html  
unuran-1.8.1/doc/unuran\_win32.info

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unuran-1.8.1/doc/unuran_win32.pdf
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unuran-1.8.1/doc/version.texi
unuran-1.8.1/doc/version_win32.texi
unuran-1.8.1/examples/Makefile.am
unuran-1.8.1/examples/Makefile.in
unuran-1.8.1/examples/example0.c
unuran-1.8.1/examples/example0_str.c
unuran-1.8.1/examples/example1.c
unuran-1.8.1/examples/example1_str.c
unuran-1.8.1/examples/example2.c
unuran-1.8.1/examples/example2_str.c
unuran-1.8.1/examples/example3.c
unuran-1.8.1/examples/example3_str.c
unuran-1.8.1/examples/example_FuncStr.c
unuran-1.8.1/examples/example_anti.c
unuran-1.8.1/examples/example_anti_str.c
unuran-1.8.1/examples/example_cext.c
unuran-1.8.1/examples/example_cont.c
unuran-1.8.1/examples/example_cont_str.c
unuran-1.8.1/examples/example_cpp.cpp
unuran-1.8.1/examples/example_dext.c
unuran-1.8.1/examples/example_discr.c
unuran-1.8.1/examples/example_discr_str.c
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unuran-1.8.1/examples/example_rngstreams.c
unuran-1.8.1/examples/example_vemp.c
unuran-1.8.1/experiments/Makefile.am
unuran-1.8.1/experiments/Makefile.in
unuran-1.8.1/experiments/make_timing_table.c
unuran-1.8.1/experiments/timings_chap_10.conf
unuran-1.8.1/experiments/timings_chap_8.conf
unuran-1.8.1/scripts/Makefile.am
unuran-1.8.1/scripts/Makefile.in
unuran-1.8.1/scripts/compute_machine_constants.c
unuran-1.8.1/scripts/make_urng_header.pl
unuran-1.8.1/scripts/merge_h.pl
unuran-1.8.1/scripts/read_PDF.pl
unuran-1.8.1/scripts/remove_comments.pl
unuran-1.8.1/scripts/run_valgrind.sh
unuran-1.8.1/scripts/win32/Makefile.win32
unuran-1.8.1/scripts/win32/build.sh
unuran-1.8.1/scripts/win32/example1.c
unuran-1.8.1/scripts/win32/example2.c
unuran-1.8.1/scripts/win32/make_dll_def.pl
unuran-1.8.1/src/Makefile.am
unuran-1.8.1/src/Makefile.in
unuran-1.8.1/src/README
unuran-1.8.1/src/distr/Makefile.am
unuran-1.8.1/src/distr/Makefile.in
unuran-1.8.1/src/distributions/Makefile.am
unuran-1.8.1/src/distributions/Makefile.in
unuran-1.8.1/src/distributions/README
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unuran-1.8.1/src/parser/make_stringparser.pl
unuran-1.8.1/src/parser/stringparser_doc.dh
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unuran-1.8.1/src/urng/Makefile.in
unuran-1.8.1/src/utills/Makefile.am
unuran-1.8.1/src/utills/Makefile.in
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unuran-1.8.1/tests/t_deprecated_vmt.c
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unuran-1.8.1/tests/t_dext.conf
unuran-1.8.1/tests/t_dgt.c
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unuran-1.8.1/tests/t\_hrd.c  
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unuran-1.8.1/tests/t\_hri.c  
unuran-1.8.1/tests/t\_hri.conf  
unuran-1.8.1/tests/t\_info.c  
unuran-1.8.1/tests/t\_info.conf  
unuran-1.8.1/tests/t\_itdr.c  
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unuran-1.8.1/tests/t\_pinv.c

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unuran-1.8.1/tests/t_srou.c
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unuran-1.8.1/tests/t_unur_tests.conf
unuran-1.8.1/tests/t_urng.c
unuran-1.8.1/tests/t_urng.conf
unuran-1.8.1/tests/t_utdr.c
unuran-1.8.1/tests/t_utdr.conf
unuran-1.8.1/tests/t_util_matrix.c
unuran-1.8.1/tests/t_util_matrix.conf
unuran-1.8.1/tests/t_vempk.c
unuran-1.8.1/tests/t_vempk.conf
unuran-1.8.1/tests/t_vnrou.c
unuran-1.8.1/tests/t_vnrou.conf
unuran-1.8.1/tests/t_x_gen.c
unuran-1.8.1/tests/t_x_gen.conf
unuran-1.8.1/tests/test_StdDistr.c
unuran-1.8.1/tests/test_StdDistr.m
unuran-1.8.1/tests/test_functionparser.c
unuran-1.8.1/tests/test_functionparser.m
unuran-1.8.1/tests/testcounter.c
unuran-1.8.1/tests/testdistributions/Makefile.am
unuran-1.8.1/tests/testdistributions/Makefile.in
unuran-1.8.1/tests/testdistributions/c_sawtooth_contpdf.c
unuran-1.8.1/tests/testdistributions/c_sawtooth_discpdf.c
unuran-1.8.1/tests/testdistributions/c_w_pdf_from_logpdf.c
unuran-1.8.1/tests/testdistributions/c_with_multiple_of_pdf.c
unuran-1.8.1/tests/testdistributions/c_wo_logpdf.c
unuran-1.8.1/tests/testdistributions/testdistributions.h
unuran-1.8.1/tests/testdistributions/vc_cauchy_RoU_ball.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_ar1.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_constantrho.c
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unuran-1.8.1/tests/testdistributions/vc_wo_logpdf.c
unuran-1.8.1/tests/testroutines.c
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unuran-1.8.1/src/distr/deprecated_distr.c
unuran-1.8.1/src/distr/deprecated_distr.h
unuran-1.8.1/src/methods/deprecated_methods.c
unuran-1.8.1/src/methods/deprecated_methods.h
unuran-1.8.1/src/methods/deprecated_tdrgw.h
unuran-1.8.1/src/methods/deprecated_vmt.c
unuran-1.8.1/src/methods/deprecated_vmt.h
unuran-1.8.1/src/methods/deprecated_vmt_struct.h
```

unuran-1.8.1/src/parser/stringparser\_lists.ch.in

UNU.RAN relies on a modified version of the library Cephес, see ./src/src/specfunct/cephes\_source.h

Details from /src/src/specfunct/cephes\_source.h

=====

This file was considerably changed for UNU.RAN.  
As a consequence it has been renamed from "mconf.h" to  
"cephes\_source.h" to avoid confusion.

We were only interested in the files:

gamma.c  
igamma.c  
incbet.c  
ndtr.c  
ndtri.c

to use these files we needed the auxiliary files:

isnan.c  
mtherr.c  
polevl.c

The aim was to enhance portability for ANSI C without expert  
knowledge of the floating point unit.

The main changes are

numeric constants (in cephес - const.c) are replaced  
by macros defined in this file (source\_mconf.h).  
We changed these constants using the constants provided by  
ANSI C in the math.h file.

We changed also the definitions of MAXGAM (in incbet.c) and of  
MAXSTIR (in gamma.c).

Everything concerning NANS and INFINITY was moved into isnan.c.  
(Also the defines to turn it off or on.)

We have only tested this version with NAN and INFINITY turned  
off, but we have not changed anything concerning that  
question. So turning this support on should (could) work.

March 26th, 2001, Josef Leydold and Wolfgang Hoermann.

/\*-----\*/

```
/*          mconf.h
 *
 * Common include file for math routines
 *
 *
 * SYNOPSIS:
 *
 * #include "mconf.h"
 *
 *
 * DESCRIPTION:
 *
 * This file contains definitions for error codes that are
 * passed to the common error handling routine mtherr()
 * (which see).
 *
 * The file also includes a conditional assembly definition
 * for the type of computer arithmetic (IEEE, DEC, Motorola
 * IEEE, or UNKnown).
 *
 * For Digital Equipment PDP-11 and VAX computers, certain
```

```
* IBM systems, and others that use numbers with a 56-bit
* significand, the symbol DEC should be defined. In this
* mode, most floating point constants are given as arrays
* of octal integers to eliminate decimal to binary conversion
* errors that might be introduced by the compiler.
*
* For little-endian computers, such as IBM PC, that follow the
* IEEE Standard for Binary Floating Point Arithmetic (ANSI/IEEE
* Std 754-1985), the symbol IBMPC should be defined. These
* numbers have 53-bit significands. In this mode, constants
* are provided as arrays of hexadecimal 16 bit integers.
*
* Big-endian IEEE format is denoted MIEEE. On some RISC
* systems such as Sun SPARC, double precision constants
* must be stored on 8-byte address boundaries. Since integer
* arrays may be aligned differently, the MIEEE configuration
* may fail on such machines.
*
* To accommodate other types of computer arithmetic, all
* constants are also provided in a normal decimal radix
* which one can hope are correctly converted to a suitable
* format by the available C language compiler. To invoke
* this mode, define the symbol UNK.
*
* An important difference among these modes is a predefined
* set of machine arithmetic constants for each. The numbers
* MACHEP (the machine roundoff error), MAXNUM (largest number
* represented), and several other parameters are preset by
* the configuration symbol. Check the file const.c to
* ensure that these values are correct for your computer.
*
* Configurations NANS, INFINITIES, MINUSZERO, and DENORMAL
* may fail on many systems. Verify that they are supposed
* to work on your computer.
*/
```

Cephes Math Library Release 2.3: June, 1995  
Copyright 1984, 1987, 1989, 1995 by Stephen L. Moshier

==numpy/logfactorial  
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Name: ID

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Name: L-BFGS-B

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- \* R. H. Byrd, P. Lu and J. Nocedal. A Limited Memory Algorithm for Bound Constrained Optimization, (1995), SIAM Journal on Scientific and Statistical Computing, 16, 5, pp. 1190-1208.
- \* C. Zhu, R. H. Byrd and J. Nocedal. L-BFGS-B: Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (1997), ACM Transactions on Mathematical Software, 23, 4, pp. 550 - 560.
- \* J.L. Morales and J. Nocedal. L-BFGS-B: Remark on Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (2011), ACM Transactions on Mathematical Software, 38, 1.

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The Python wrapper

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Original algorithm for the implementation of `rk_interval` function from Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by Magnus Jonsson.

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```

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 This is a bundle of X.509 certificates of public Certificate Authorities (CA). These were automatically extracted from Mozilla's root certificates file (certdata.txt). This file can be found in the mozilla source tree: <https://hg.mozilla.org/mozilla-central/file/tip/security/nss/lib/ckfw/builtins/certdata.txt>  
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port/cpl\_float.cpp

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frmts/pdf/pdfdataset.cpp (method PDFiumRenderPageBitmap())  
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frmts/mrf/\* (apply when MRF driver included in build)  
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cmake/modules/3.\* (backported CMake find modules)

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ogr/ogrsf\_frmts/flatgeobuf

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ogr/ogrsf\_frmts/flatgeobuf/flatbuffers

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

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| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
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| 2.4            | 2.3          | 2004      | PSF        | yes                 |
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Original algorithm for the implementation of `rk_interval` function from  
Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by

Magnus Jonsson.

Constants used in the rk\_double implementation by Isaku Wada.

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PCG Random Number Generation for C.

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Adapted from a C++ implementation of Chris Doty-Humphrey's SFC PRNG.

<https://gist.github.com/imneme/flf7821f07cf76504a97f6537c818083>

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== biasedurn

----- Forwarded message -----

From: Agner Fog <agner@agner.org>  
Date: Wed, Jul 22, 2020 at 8:54 PM  
Subject: Re: Add BiasedUrn to SciPy?  
To: Matt Haberland <mhaberland@calpoly.edu>  
Cc: Warren Weckesser <warren.weckesser@gmail.com>

Dear Matt The C++ code for these distributions without binding to the R project are available here:

<https://www.agner.org/random/stocc.zip>

You have my permission to use it in SciPy under the new BSD license.

Best regards,

Agner Fog

On 22/07/2020 17.05, Matt Haberland wrote:

Hi Agner, I'm a maintainer of the Python scientific computing library SciPy, and I'm working on improving the capabilities of our statistics subpackage scipy.stats. We'd like to add both Fisher's and Wallenius' noncentral hypergeometric distributions, but these look quite challenging to implement. We found your BiasedUrn package, and we'd love to wrap it, but we can't include GPL-3 licensed code under our BSD-new license. Would you consider re-licensing BiasedUrn under a more permissive license, such as BSD-new or MIT, so we can include it in SciPy?

Thank you for considering it!

Matt

--

Matt Haberland  
Assistant Professor  
BioResource and Agricultural Engineering  
08A-3K, Cal Poly

==uru.ran

Permission was granted on 23 March 2021 by Josef Leydold (josef.leydold@wu.ac.at) and Wolfgang Hoermann (hormannw@bound.edu.tr) to use the UNU.RAN code excluding the uniform random number generator in src/uniform/mrg31k3p.c (copyright by Renee Touzin) under the BSD licence. The following files have been removed from the original library:

- unuran-1.8.1/COPYING
- unuran-1.8.1/INSTALL
- unuran-1.8.1/Makefile.am
- unuran-1.8.1/Makefile.in
- unuran-1.8.1/NEWS
- unuran-1.8.1/UPGRADE
- unuran-1.8.1/acinclude.m4
- unuran-1.8.1/aclocal.m4
- unuran-1.8.1/autoconf/config.guess
- unuran-1.8.1/autoconf/config.sub
- unuran-1.8.1/autoconf/depcomp
- unuran-1.8.1/autoconf/install-sh
- unuran-1.8.1/autoconf/ltmain.sh
- unuran-1.8.1/autoconf/mdate-sh
- unuran-1.8.1/autoconf/missing
- unuran-1.8.1/autogen.sh
- unuran-1.8.1/configure
- unuran-1.8.1/doc/Makefile.am
- unuran-1.8.1/doc/Makefile.in
- unuran-1.8.1/doc/figures/Makefile.am
- unuran-1.8.1/doc/figures/Makefile.in

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unuran-1.8.1/doc/src/error_debug.dh
unuran-1.8.1/doc/src/examples.dh
unuran-1.8.1/doc/src/glossary.dh
unuran-1.8.1/doc/src/index.dh
unuran-1.8.1/doc/src/installation.dh
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unuran-1.8.1/doc/src/methods_mcmc.texi
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unuran-1.8.1/doc/src/ref_example_cont.texi
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unuran-1.8.1/doc/src/ref_example_dext.texi
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unuran-1.8.1/doc/src/ref_example_rngstreams.texi
unuran-1.8.1/doc/src/ref_example_vemp.texi
unuran-1.8.1/doc/src/ref_example_win32_1.texi
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unuran-1.8.1/doc/unuran.html  
unuran-1.8.1/doc/unuran.info  
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unuran-1.8.1/doc/unuran\_win32\_libname.texi  
unuran-1.8.1/doc/version.texi  
unuran-1.8.1/doc/version\_win32.texi  
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unuran-1.8.1/examples/example0\_str.c  
unuran-1.8.1/examples/example1.c  
unuran-1.8.1/examples/example1\_str.c  
unuran-1.8.1/examples/example2.c  
unuran-1.8.1/examples/example2\_str.c  
unuran-1.8.1/examples/example3.c  
unuran-1.8.1/examples/example3\_str.c  
unuran-1.8.1/examples/example\_FuncStr.c  
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unuran-1.8.1/examples/example\_anti\_str.c  
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unuran-1.8.1/examples/example\_cont.c  
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unuran-1.8.1/examples/example\_discr\_str.c  
unuran-1.8.1/examples/example\_emp.c  
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unuran-1.8.1/examples/example\_mixt\_inv.c  
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unuran-1.8.1/experiments/Makefile.in  
unuran-1.8.1/experiments/make\_timing\_table.c  
unuran-1.8.1/experiments/timings\_chap\_10.conf  
unuran-1.8.1/experiments/timings\_chap\_8.conf  
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unuran-1.8.1/scripts/compute\_machine\_constants.c  
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unuran-1.8.1/scripts/merge\_h.pl  
unuran-1.8.1/scripts/read\_PDF.pl

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unuran-1.8.1/scripts/win32/build.sh
unuran-1.8.1/scripts/win32/example1.c
unuran-1.8.1/scripts/win32/example2.c
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unuran-1.8.1/src/uniform/unuran_urng_prng.h
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unuran-1.8.1/src/uniform/urng_builtin.c
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unuran-1.8.1/tests/t_vempk.conf
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unuran-1.8.1/tests/t_vnrou.conf
unuran-1.8.1/tests/t_x_gen.c
unuran-1.8.1/tests/t_x_gen.conf
unuran-1.8.1/tests/test_StdDistr.c
unuran-1.8.1/tests/test_StdDistr.m
unuran-1.8.1/tests/test_functionparser.c
unuran-1.8.1/tests/test_functionparser.m
unuran-1.8.1/tests/testcounter.c
unuran-1.8.1/tests/testdistributions/Makefile.am
unuran-1.8.1/tests/testdistributions/Makefile.in
unuran-1.8.1/tests/testdistributions/c_sawtooth_contpdf.c
unuran-1.8.1/tests/testdistributions/c_sawtooth_discpdf.c
unuran-1.8.1/tests/testdistributions/c_w_pdf_from_logpdf.c
unuran-1.8.1/tests/testdistributions/c_with_multiple_of_pdf.c
unuran-1.8.1/tests/testdistributions/c_wo_logpdf.c
unuran-1.8.1/tests/testdistributions/testdistributions.h
```

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unuran-1.8.1/tests/testdistributions/vc_cauchy_RoU_ball.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_ar1.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_constantrho.c
unuran-1.8.1/tests/testdistributions/vc_w_marginals.c
unuran-1.8.1/tests/testdistributions/vc_wo_logpdf.c
unuran-1.8.1/tests/testroutines.c
unuran-1.8.1/tests/testunuran.h
unuran-1.8.1/src/distr/deprecated_distr.c
unuran-1.8.1/src/distr/deprecated_distr.h
unuran-1.8.1/src/methods/deprecated_methods.c
unuran-1.8.1/src/methods/deprecated_methods.h
unuran-1.8.1/src/methods/deprecated_tdrwg.h
unuran-1.8.1/src/methods/deprecated_vmt.c
unuran-1.8.1/src/methods/deprecated_vmt.h
unuran-1.8.1/src/methods/deprecated_vmt_struct.h
unuran-1.8.1/src/parser/stringparser_lists.ch.in
```

UNU.RAN relies on a modified version of the library Cephes, see `./src/src/specfunct/cephes_source.h`

Details from `/src/src/specfunct/cephes_source.h`

=====

This file was considerably changed for UNU.RAN.  
As a consequence it has been renamed from "mconf.h" to  
"cephes\_source.h" to avoid confusion.

We were only interested in the files:

```
gamma.c
igamma.c
incbet.c
ndtr.c
ndtri.c
```

to use these files we needed the auxiliary files:

```
isnan.c
mtherr.c
polevl.c
```

The aim was to enhance portability for ANSI C without expert knowledge of the floating point unit.

The main changes are

```
numeric constants (in cephes - const.c) are replaced
by macros defined in this file (source_mconf.h).
We changed these constants using the constants provided by
ANSI C in the math.h file.
We changed also the definitions of MAXGAM (in incbet.c) and of
MAXSTIR (in gamma.c).
Everything concerning NANS and INFINITY was moved into isnan.c.
(Also the defines to turn it off or on.)
We have only tested this version with NAN and INFINITY turned
off, but we have not changed anything concerning that
question. So turning this support on should (could) work.
```

March 26th, 2001, Josef Leydold and Wolfgang Hoermann.

/\*-----\*/

```
/*          mconf.h
*
* Common include file for math routines
*
*
* SYNOPSIS:
*
```

```
* #include "mconf.h"
*
*
* DESCRIPTION:
*
* This file contains definitions for error codes that are
* passed to the common error handling routine mterr()
* (which see).
*
* The file also includes a conditional assembly definition
* for the type of computer arithmetic (IEEE, DEC, Motorola
* IEEE, or UNKnown).
*
* For Digital Equipment PDP-11 and VAX computers, certain
* IBM systems, and others that use numbers with a 56-bit
* significand, the symbol DEC should be defined. In this
* mode, most floating point constants are given as arrays
* of octal integers to eliminate decimal to binary conversion
* errors that might be introduced by the compiler.
*
* For little-endian computers, such as IBM PC, that follow the
* IEEE Standard for Binary Floating Point Arithmetic (ANSI/IEEE
* Std 754-1985), the symbol IBMPC should be defined. These
* numbers have 53-bit significands. In this mode, constants
* are provided as arrays of hexadecimal 16 bit integers.
*
* Big-endian IEEE format is denoted MIEEE. On some RISC
* systems such as Sun SPARC, double precision constants
* must be stored on 8-byte address boundaries. Since integer
* arrays may be aligned differently, the MIEEE configuration
* may fail on such machines.
*
* To accommodate other types of computer arithmetic, all
* constants are also provided in a normal decimal radix
* which one can hope are correctly converted to a suitable
* format by the available C language compiler. To invoke
* this mode, define the symbol UNK.
*
* An important difference among these modes is a predefined
* set of machine arithmetic constants for each. The numbers
* MACHEP (the machine roundoff error), MAXNUM (largest number
* represented), and several other parameters are preset by
* the configuration symbol. Check the file const.c to
* ensure that these values are correct for your computer.
*
* Configurations NANS, INFINITIES, MINUSZERO, and DENORMAL
* may fail on many systems. Verify that they are supposed
* to work on your computer.
*/
```

Cephes Math Library Release 2.3: June, 1995  
Copyright 1984, 1987, 1989, 1995 by Stephen L. Moshier

Name: Decorator

```
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Name: L-BFGS-B

This is a Python wrapper (using F2PY) written by David M. Cooke <cookedm@physics.mcmaster.ca> and released as version 0.9 on April 9, 2004. The wrapper was slightly modified by Joonas Paalasmaa for the 3.0 version in March 2012.

License of L-BFGS-B (Fortran code)

=====

The version included here (in lbfgsb.f) is 3.0 (released April 25, 2011). It was written by Ciyou Zhu, Richard Byrd, and Jorge Nocedal <nocedal@ece.nwu.edu>. It carries the following condition for use:

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References

- \* R. H. Byrd, P. Lu and J. Nocedal. A Limited Memory Algorithm for Bound Constrained Optimization, (1995), SIAM Journal on Scientific and Statistical Computing, 16, 5, pp. 1190-1208.
- \* C. Zhu, R. H. Byrd and J. Nocedal. L-BFGS-B: Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (1997), ACM Transactions on Mathematical Software, 23, 4, pp. 550 - 560.
- \* J.L. Morales and J. Nocedal. L-BFGS-B: Remark on Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (2011), ACM Transactions on Mathematical Software, 38, 1.

"""

The Python wrapper

=====

This code uses F2PY (<http://cens.ioc.ee/projects/f2py2e/>) to generate the wrapper around the Fortran code.

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-----  
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C.B. Barber  
Arlington, MA

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Original algorithm for the implementation of `rk_interval` function from Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by Magnus Jonsson.

Constants used in the `rk_double` implementation by Isaku Wada.

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```

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```

```
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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to



BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release        | Derived from | Year      | Owner      | GPL-compatible? (1) |
|----------------|--------------|-----------|------------|---------------------|
| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |
| 2.2            | 2.1.1        | 2001      | PSF        | yes                 |
| 2.1.2          | 2.1.1        | 2002      | PSF        | yes                 |
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| 2.2.1          | 2.2          | 2002      | PSF        | yes                 |
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| 2.3.5          | 2.3.4        | 2005      | PSF        | yes                 |
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Files: numpy/core/src/multiarray/dragon4.c

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Name: libdivide

Files: numpy/core/include/numpy/libdivide/\*

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Note that the following files are vendored in the repository and sdist but not installed in built numpy packages:

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Original algorithm for the implementation of `rk_interval` function from Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by Magnus Jonsson.

Constants used in the `rk_double` implementation by Isaku Wada.

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Adapted from a C++ implementation of Chris Doty-Humphrey's SFC PRNG.

<https://gist.github.com/imneme/flf7821f07cf76504a97f6537c818083>

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Name: Faddeeva



Files: scipy/special/Faddeeva.\*

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Name: ampgo  
Files: benchmarks/benchmarks/go\_benchmark\_functions/\*.py  
License: MIT  
Functions for testing global optimizers, forked from the AMPGO project,  
<https://code.google.com/archive/p/ampgo>

Name: pybind11  
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== biasedurn

----- Forwarded message -----

From: Agner Fog <agner@agner.org>  
Date: Wed, Jul 22, 2020 at 8:54 PM  
Subject: Re: Add BiasedUrn to SciPy?  
To: Matt Haberland <mhaberland@calpoly.edu>  
Cc: Warren Weckesser <warren.weckesser@gmail.com>

Dear Matt The C++ code for these distributions without binding to the R project are available here:

<https://www.agner.org/random/stocc.zip>

You have my permission to use it in SciPy under the new BSD license.

Best regards,

Agner Fog

On 22/07/2020 17.05, Matt Haberland wrote:

Hi Agner, I'm a maintainer of the Python scientific computing library SciPy, and I'm working on improving the capabilities of our statistics subpackage scipy.stats. We'd like to add both Fisher's and Wallenius' noncentral hypergeometric distributions, but these look quite challenging to implement. We found your BiasedUrn package, and we'd love to wrap it, but we can't include GPL-3 licensed code under our BSD-new license. Would you consider re-licensing BiasedUrn under a more permissive license, such as BSD-new or MIT, so we can include it in SciPy?

Thank you for considering it!

Matt

--

Matt Haberland  
Assistant Professor  
BioResource and Agricultural Engineering  
08A-3K, Cal Poly

==uru.ran

Permission was granted on 23 March 2021 by Josef Leydold (josef.leydold@wu.ac.at) and Wolfgang Hoermann (hormannw@bound.edu.tr) to use the UNU.RAN code excluding the uniform random number generator in src/uniform/mrg31k3p.c (copyright by Renee Touzin) under the BSD licence. The following files have been removed from the original library:

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- unuran-1.8.1/autoconf/config.guess
- unuran-1.8.1/autoconf/config.sub
- unuran-1.8.1/autoconf/depcomp

```
unuran-1.8.1/autoconf/install-sh
unuran-1.8.1/autoconf/ltmain.sh
unuran-1.8.1/autoconf/mdate-sh
unuran-1.8.1/autoconf/missing
unuran-1.8.1/autogen.sh
unuran-1.8.1/configure
unuran-1.8.1/doc/Makefile.am
unuran-1.8.1/doc/Makefile.in
unuran-1.8.1/doc/figures/Makefile.am
unuran-1.8.1/doc/figures/Makefile.in
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unuran-1.8.1/doc/figures/discrete_inversion.pdf
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unuran-1.8.1/doc/figures/discrete_inversion.txt
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unuran-1.8.1/doc/src/methods_cvemp.texi
unuran-1.8.1/doc/src/methods_discr.texi
unuran-1.8.1/doc/src/methods_matr.texi
unuran-1.8.1/doc/src/methods_mcmc.texi
unuran-1.8.1/doc/src/misc.dh
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unuran-1.8.1/doc/src/ref_example0_str.texi
unuran-1.8.1/doc/src/ref_example1.texi
unuran-1.8.1/doc/src/ref_example1_str.texi
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unuran-1.8.1/doc/src/ref_example_dext.texi
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unuran-1.8.1/doc/src/ref\_example\_discr.texi  
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unuran-1.8.1/doc/src/ref\_example\_emp\_str.texi  
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unuran-1.8.1/doc/src/references.dh  
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unuran-1.8.1/doc/stamp-vti  
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unuran-1.8.1/doc/unuran\_win32.texi  
unuran-1.8.1/doc/unuran\_win32\_libname.texi  
unuran-1.8.1/doc/version.texi  
unuran-1.8.1/doc/version\_win32.texi  
unuran-1.8.1/examples/Makefile.am  
unuran-1.8.1/examples/Makefile.in  
unuran-1.8.1/examples/example0.c  
unuran-1.8.1/examples/example0\_str.c  
unuran-1.8.1/examples/example1.c  
unuran-1.8.1/examples/example1\_str.c  
unuran-1.8.1/examples/example2.c  
unuran-1.8.1/examples/example2\_str.c  
unuran-1.8.1/examples/example3.c  
unuran-1.8.1/examples/example3\_str.c  
unuran-1.8.1/examples/example\_FuncStr.c  
unuran-1.8.1/examples/example\_anti.c  
unuran-1.8.1/examples/example\_anti\_str.c  
unuran-1.8.1/examples/example\_cext.c  
unuran-1.8.1/examples/example\_cont.c  
unuran-1.8.1/examples/example\_cont\_str.c  
unuran-1.8.1/examples/example\_cpp.cpp  
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unuran-1.8.1/examples/example\_discr\_str.c  
unuran-1.8.1/examples/example\_emp.c  
unuran-1.8.1/examples/example\_emp\_str.c  
unuran-1.8.1/examples/example\_errorhandler.c  
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unuran-1.8.1/examples/example\_mixt\_inv.c  
unuran-1.8.1/examples/example\_prng.c  
unuran-1.8.1/examples/example\_prng\_str.c  
unuran-1.8.1/examples/example\_rngstreams.c  
unuran-1.8.1/examples/example\_vemp.c  
unuran-1.8.1/experiments/Makefile.am



```
unuran-1.8.1/src/utils/Makefile.in
unuran-1.8.1/tests/Makefile.am
unuran-1.8.1/tests/Makefile.in
unuran-1.8.1/tests/README.conf
unuran-1.8.1/tests/make_test_files.pl
unuran-1.8.1/tests/t_arou.c
unuran-1.8.1/tests/t_arou.conf
unuran-1.8.1/tests/t_ars.c
unuran-1.8.1/tests/t_ars.conf
unuran-1.8.1/tests/t_auto.c
unuran-1.8.1/tests/t_auto.conf
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unuran-1.8.1/tests/t_cext.conf
unuran-1.8.1/tests/t_cstd.c
unuran-1.8.1/tests/t_cstd.conf
unuran-1.8.1/tests/t_dari.c
unuran-1.8.1/tests/t_dari.conf
unuran-1.8.1/tests/t_dau.c
unuran-1.8.1/tests/t_dau.conf
unuran-1.8.1/tests/t_deprecated_tdrwg.c
unuran-1.8.1/tests/t_deprecated_vmt.c
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unuran-1.8.1/tests/t_distr_cemp.conf
unuran-1.8.1/tests/t_distr_condi.c
unuran-1.8.1/tests/t_distr_condi.conf
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unuran-1.8.1/tests/t_hist.c
unuran-1.8.1/tests/t_hist.conf
```



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unuran-1.8.1/tests/t_x_gen.c
unuran-1.8.1/tests/t_x_gen.conf
unuran-1.8.1/tests/test_StdDistr.c
unuran-1.8.1/tests/test_StdDistr.m
unuran-1.8.1/tests/test_functionparser.c
```

```
unuran-1.8.1/tests/test_functionparser.m
unuran-1.8.1/tests/testcounter.c
unuran-1.8.1/tests/testdistributions/Makefile.am
unuran-1.8.1/tests/testdistributions/Makefile.in
unuran-1.8.1/tests/testdistributions/c_sawtooth_contpdf.c
unuran-1.8.1/tests/testdistributions/c_sawtooth_discpdf.c
unuran-1.8.1/tests/testdistributions/c_w_pdf_from_logpdf.c
unuran-1.8.1/tests/testdistributions/c_with_multiple_of_pdf.c
unuran-1.8.1/tests/testdistributions/c_wo_logpdf.c
unuran-1.8.1/tests/testdistributions/testdistributions.h
unuran-1.8.1/tests/testdistributions/vc_cauchy_RoU_ball.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_ar1.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_constantrho.c
unuran-1.8.1/tests/testdistributions/vc_w_marginals.c
unuran-1.8.1/tests/testdistributions/vc_wo_logpdf.c
unuran-1.8.1/tests/testroutines.c
unuran-1.8.1/tests/testunuran.h
unuran-1.8.1/src/distr/deprecated_distr.c
unuran-1.8.1/src/distr/deprecated_distr.h
unuran-1.8.1/src/methods/deprecated_methods.c
unuran-1.8.1/src/methods/deprecated_methods.h
unuran-1.8.1/src/methods/deprecated_tdrwg.h
unuran-1.8.1/src/methods/deprecated_vmt.c
unuran-1.8.1/src/methods/deprecated_vmt.h
unuran-1.8.1/src/methods/deprecated_vmt_struct.h
unuran-1.8.1/src/parser/stringparser_lists.ch.in
```

UNU.RAN relies on a modified version of the library Cephес, see `./src/src/specfunct/cephes_source.h`

Details from `/src/src/specfunct/cephes_source.h`

=====

This file was considerably changed for UNU.RAN.  
As a consequence it has been renamed from "mconf.h" to  
"cephes\_source.h" to avoid confusion.

We were only interested in the files:

```
gamma.c
igamma.c
incbet.c
ndtr.c
ndtri.c
```

to use these files we needed the auxiliary files:

```
isnan.c
mtherr.c
polevl.c
```

The aim was to enhance portability for ANSI C without expert knowledge of the floating point unit.

The main changes are

```
numeric constants (in cephес - const.c) are replaced
by macros defined in this file (source_mconf.h).
We changed these constants using the constants provided by
ANSI C in the math.h file.
We changed also the definitions of MAXGAM (in incbet.c) and of
MAXSTIR (in gamma.c).
Everything concerning NANS and INFINITY was moved into isnan.c.
(Also the defines to turn it off or on.)
We have only tested this version with NAN and INFINITY turned
off, but we have not changed anything concerning that
question. So turning this support on should (could) work.
```

March 26th, 2001, Josef Leydold and Wolfgang Hoermann.

```
/*-----*/  
  
/*          mconf.h  
*  
* Common include file for math routines  
*  
*  
* SYNOPSIS:  
*  
* #include "mconf.h"  
*  
*  
* DESCRIPTION:  
*  
* This file contains definitions for error codes that are  
* passed to the common error handling routine mterr()  
* (which see).  
*  
* The file also includes a conditional assembly definition  
* for the type of computer arithmetic (IEEE, DEC, Motorola  
* IEEE, or UNKnown).  
*  
* For Digital Equipment PDP-11 and VAX computers, certain  
* IBM systems, and others that use numbers with a 56-bit  
* significand, the symbol DEC should be defined. In this  
* mode, most floating point constants are given as arrays  
* of octal integers to eliminate decimal to binary conversion  
* errors that might be introduced by the compiler.  
*  
* For little-endian computers, such as IBM PC, that follow the  
* IEEE Standard for Binary Floating Point Arithmetic (ANSI/IEEE  
* Std 754-1985), the symbol IBMPC should be defined. These  
* numbers have 53-bit significands. In this mode, constants  
* are provided as arrays of hexadecimal 16 bit integers.  
*  
* Big-endian IEEE format is denoted MIEEE. On some RISC  
* systems such as Sun SPARC, double precision constants  
* must be stored on 8-byte address boundaries. Since integer  
* arrays may be aligned differently, the MIEEE configuration  
* may fail on such machines.  
*  
* To accommodate other types of computer arithmetic, all  
* constants are also provided in a normal decimal radix  
* which one can hope are correctly converted to a suitable  
* format by the available C language compiler. To invoke  
* this mode, define the symbol UNK.  
*  
* An important difference among these modes is a predefined  
* set of machine arithmetic constants for each. The numbers  
* MACHEP (the machine roundoff error), MAXNUM (largest number  
* represented), and several other parameters are preset by  
* the configuration symbol. Check the file const.c to  
* ensure that these values are correct for your computer.  
*  
* Configurations NANS, INFINITIES, MINUSZERO, and DENORMAL  
* may fail on many systems. Verify that they are supposed  
* to work on your computer.  
*/
```

Cephes Math Library Release 2.3: June, 1995

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-----  
Name: Decorator

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Name: ID

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Name: L-BFGS-B

This is a Python wrapper (using F2PY) written by David M. Cooke <cookedm@physics.mcmaster.ca> and released as version 0.9 on April 9, 2004. The wrapper was slightly modified by Joonas Paalasmaa for the 3.0 version in March 2012.

License of L-BFGS-B (Fortran code)  
=====

The version included here (in lbfgsb.f) is 3.0 (released April 25, 2011). It was written by Ciyou Zhu, Richard Byrd, and Jorge Nocedal <nocedal@ece.nwu.edu>. It carries the following condition for use:

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References

- \* R. H. Byrd, P. Lu and J. Nocedal. A Limited Memory Algorithm for Bound Constrained Optimization, (1995), SIAM Journal on Scientific and Statistical Computing, 16, 5, pp. 1190-1208.
- \* C. Zhu, R. H. Byrd and J. Nocedal. L-BFGS-B: Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (1997), ACM Transactions on Mathematical Software, 23, 4, pp. 550 - 560.
- \* J.L. Morales and J. Nocedal. L-BFGS-B: Remark on Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (2011), ACM Transactions on Mathematical Software, 38, 1.

```
"""
```

The Python wrapper  
=====

This code uses F2PY (<http://cens.ioc.ee/projects/f2py2e/>) to generate the wrapper around the Fortran code.

The Python code and wrapper are copyrighted 2004 by David M. Cooke <cookedm@physics.mcmaster.ca>.

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Name: Qhull

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Arlington, MA

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Name: uarray

Files: scipy/\_lib/uarray/\*

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Original algorithm for the implementation of rk\_interval function from Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by Magnus Jonsson.

Constants used in the rk\_double implementation by Isaku Wada.

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A. HISTORY OF THE SOFTWARE

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <http://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations (now Zope Corporation, see <http://www.zope.com>). In 2001, the Python Software Foundation (PSF, see <http://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation is a sponsoring member of the PSF.

All Python releases are Open Source (see <http://www.opensource.org> for the Open Source Definition). Historically, most, but not all, Python releases have also been GPL-compatible; the table below summarizes the various releases.

| Release        | Derived from | Year      | Owner      | GPL-compatible? (1) |
|----------------|--------------|-----------|------------|---------------------|
| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |

|       |       |           |     |     |
|-------|-------|-----------|-----|-----|
| 2.2   | 2.1.1 | 2001      | PSF | yes |
| 2.1.2 | 2.1.1 | 2002      | PSF | yes |
| 2.1.3 | 2.1.2 | 2002      | PSF | yes |
| 2.2.1 | 2.2   | 2002      | PSF | yes |
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| 2.2.3 | 2.2.2 | 2003      | PSF | yes |
| 2.3   | 2.2.2 | 2002-2003 | PSF | yes |
| 2.3.1 | 2.3   | 2002-2003 | PSF | yes |
| 2.3.2 | 2.3.1 | 2002-2003 | PSF | yes |
| 2.3.3 | 2.3.2 | 2002-2003 | PSF | yes |
| 2.3.4 | 2.3.3 | 2004      | PSF | yes |
| 2.3.5 | 2.3.4 | 2005      | PSF | yes |
| 2.4   | 2.3   | 2004      | PSF | yes |
| 2.4.1 | 2.4   | 2005      | PSF | yes |
| 2.4.2 | 2.4.1 | 2005      | PSF | yes |
| 2.4.3 | 2.4.2 | 2006      | PSF | yes |
| 2.4.4 | 2.4.3 | 2006      | PSF | yes |
| 2.5   | 2.4   | 2006      | PSF | yes |
| 2.5.1 | 2.5   | 2007      | PSF | yes |
| 2.5.2 | 2.5.1 | 2008      | PSF | yes |
| 2.5.3 | 2.5.2 | 2008      | PSF | yes |
| 2.6   | 2.5   | 2008      | PSF | yes |
| 2.6.1 | 2.6   | 2008      | PSF | yes |
| 2.6.2 | 2.6.1 | 2009      | PSF | yes |
| 2.6.3 | 2.6.2 | 2009      | PSF | yes |
| 2.6.4 | 2.6.3 | 2009      | PSF | yes |
| 2.6.5 | 2.6.4 | 2010      | PSF | yes |
| 2.7   | 2.6   | 2010      | PSF | yes |

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== philox (embedded)

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Adapted from a C++ implementation of Chris Doty-Humphrey's SFC PRNG.

<https://gist.github.com/imneme/flf7821f07cf76504a97f6537c818083>

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```
== splitmix64 (embedded)
Written in 2015 by Sebastiano Vigna (vigna@acm.org)
```

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Subject: Re: Add BiasedUrn to SciPy?  
To: Matt Haberland <mhaberla@calpoly.edu>  
Cc: Warren Weckesser <warren.weckesser@gmail.com>

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Best regards,  
Agner Fog

On 22/07/2020 17.05, Matt Haberland wrote:  
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scipy.stats. We'd like to add both Fisher's and Wallenius' noncentral  
hypergeometric distributions, but these look quite challenging to implement.  
We found your BiasedUrn package, and we'd love to wrap it, but we can't  
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Thank you for considering it!

Matt

--

Matt Haberland  
Assistant Professor  
BioResource and Agricultural Engineering  
08A-3K, Cal Poly

==uru.ran

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unuran-1.8.1/doc/figures/Makefile.am
unuran-1.8.1/doc/figures/Makefile.in
unuran-1.8.1/doc/figures/discrete_inversion.eps
unuran-1.8.1/doc/figures/discrete_inversion.pdf
unuran-1.8.1/doc/figures/discrete_inversion.png
unuran-1.8.1/doc/figures/discrete_inversion.txt
unuran-1.8.1/doc/figures/inversion.eps
unuran-1.8.1/doc/figures/inversion.pdf
unuran-1.8.1/doc/figures/inversion.png
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unuran-1.8.1/doc/figures/rejection_from_constant_hat.pdf
unuran-1.8.1/doc/figures/rejection_from_constant_hat.png
unuran-1.8.1/doc/figures/rejection_from_constant_hat.txt
unuran-1.8.1/doc/figures/rou-cauchy.eps
unuran-1.8.1/doc/figures/rou-cauchy.pdf
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unuran-1.8.1/doc/figures/rou-cauchy.png  
unuran-1.8.1/doc/figures/rou-cauchy.txt  
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unuran-1.8.1/doc/src/Makefile.am  
unuran-1.8.1/doc/src/Makefile.in  
unuran-1.8.1/doc/src/README  
unuran-1.8.1/doc/src/arvag.dh  
unuran-1.8.1/doc/src/error\_debug.dh  
unuran-1.8.1/doc/src/examples.dh  
unuran-1.8.1/doc/src/glossary.dh  
unuran-1.8.1/doc/src/index.dh  
unuran-1.8.1/doc/src/installation.dh  
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unuran-1.8.1/doc/src/make\_texti.pl  
unuran-1.8.1/doc/src/methods.dh  
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unuran-1.8.1/doc/src/methods\_cont.texi  
unuran-1.8.1/doc/src/methods\_cvec.texi  
unuran-1.8.1/doc/src/methods\_cvemp.texi  
unuran-1.8.1/doc/src/methods\_discr.texi  
unuran-1.8.1/doc/src/methods\_matr.texi  
unuran-1.8.1/doc/src/methods\_mcmc.texi  
unuran-1.8.1/doc/src/misc.dh  
unuran-1.8.1/doc/src/ref\_example0.texi  
unuran-1.8.1/doc/src/ref\_example0\_str.texi  
unuran-1.8.1/doc/src/ref\_example1.texi  
unuran-1.8.1/doc/src/ref\_example1\_str.texi  
unuran-1.8.1/doc/src/ref\_example2.texi  
unuran-1.8.1/doc/src/ref\_example2\_str.texi  
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unuran-1.8.1/doc/src/ref\_example\_anti.texi  
unuran-1.8.1/doc/src/ref\_example\_anti\_str.texi  
unuran-1.8.1/doc/src/ref\_example\_cext.texi  
unuran-1.8.1/doc/src/ref\_example\_cont.texi  
unuran-1.8.1/doc/src/ref\_example\_cont\_str.texi  
unuran-1.8.1/doc/src/ref\_example\_dext.texi  
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unuran-1.8.1/doc/src/ref\_example\_emp\_str.texi  
unuran-1.8.1/doc/src/ref\_example\_gsl.texi  
unuran-1.8.1/doc/src/ref\_example\_mixt.texi  
unuran-1.8.1/doc/src/ref\_example\_mixt\_inv.texi  
unuran-1.8.1/doc/src/ref\_example\_rngstreams.texi  
unuran-1.8.1/doc/src/ref\_example\_vemp.texi  
unuran-1.8.1/doc/src/ref\_example\_win32\_1.texi  
unuran-1.8.1/doc/src/ref\_example\_win32\_2.texi  
unuran-1.8.1/doc/src/references.dh  
unuran-1.8.1/doc/src/stdhist.dh  
unuran-1.8.1/doc/src/texinfo.tex  
unuran-1.8.1/doc/src/top.dh  
unuran-1.8.1/doc/src/unuran\_src.texi  
unuran-1.8.1/doc/stamp-1  
unuran-1.8.1/doc/stamp-vti  
unuran-1.8.1/doc/unuran.html  
unuran-1.8.1/doc/unuran.info  
unuran-1.8.1/doc/unuran.pdf  
unuran-1.8.1/doc/unuran.texi  
unuran-1.8.1/doc/unuran.txt  
unuran-1.8.1/doc/unuran\_win32.html

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unuran-1.8.1/doc/unuran_win32.info
unuran-1.8.1/doc/unuran_win32.pdf
unuran-1.8.1/doc/unuran_win32.texi
unuran-1.8.1/doc/unuran_win32_libname.texi
unuran-1.8.1/doc/version.texi
unuran-1.8.1/doc/version_win32.texi
unuran-1.8.1/examples/Makefile.am
unuran-1.8.1/examples/Makefile.in
unuran-1.8.1/examples/example0.c
unuran-1.8.1/examples/example0_str.c
unuran-1.8.1/examples/example1.c
unuran-1.8.1/examples/example1_str.c
unuran-1.8.1/examples/example2.c
unuran-1.8.1/examples/example2_str.c
unuran-1.8.1/examples/example3.c
unuran-1.8.1/examples/example3_str.c
unuran-1.8.1/examples/example_FuncStr.c
unuran-1.8.1/examples/example_anti.c
unuran-1.8.1/examples/example_anti_str.c
unuran-1.8.1/examples/example_cext.c
unuran-1.8.1/examples/example_cont.c
unuran-1.8.1/examples/example_cont_str.c
unuran-1.8.1/examples/example_cpp.cpp
unuran-1.8.1/examples/example_dext.c
unuran-1.8.1/examples/example_discr.c
unuran-1.8.1/examples/example_discr_str.c
unuran-1.8.1/examples/example_emp.c
unuran-1.8.1/examples/example_emp_str.c
unuran-1.8.1/examples/example_errorhandler.c
unuran-1.8.1/examples/example_gsl.c
unuran-1.8.1/examples/example_mcorr.c
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unuran-1.8.1/examples/example_mixt_inv.c
unuran-1.8.1/examples/example_prng.c
unuran-1.8.1/examples/example_prng_str.c
unuran-1.8.1/examples/example_rngstreams.c
unuran-1.8.1/examples/example_vemp.c
unuran-1.8.1/experiments/Makefile.am
unuran-1.8.1/experiments/Makefile.in
unuran-1.8.1/experiments/make_timing_table.c
unuran-1.8.1/experiments/timings_chap_10.conf
unuran-1.8.1/experiments/timings_chap_8.conf
unuran-1.8.1/scripts/Makefile.am
unuran-1.8.1/scripts/Makefile.in
unuran-1.8.1/scripts/compute_machine_constants.c
unuran-1.8.1/scripts/make_urng_header.pl
unuran-1.8.1/scripts/merge_h.pl
unuran-1.8.1/scripts/read_PDF.pl
unuran-1.8.1/scripts/remove_comments.pl
unuran-1.8.1/scripts/run_valgrind.sh
unuran-1.8.1/scripts/win32/Makefile.win32
unuran-1.8.1/scripts/win32/build.sh
unuran-1.8.1/scripts/win32/example1.c
unuran-1.8.1/scripts/win32/example2.c
unuran-1.8.1/scripts/win32/make_dll_def.pl
unuran-1.8.1/src/Makefile.am
unuran-1.8.1/src/Makefile.in
unuran-1.8.1/src/README
unuran-1.8.1/src/distr/Makefile.am
unuran-1.8.1/src/distr/Makefile.in
unuran-1.8.1/src/distributions/Makefile.am
unuran-1.8.1/src/distributions/Makefile.in
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unuran-1.8.1/src/methods/Makefile.in
unuran-1.8.1/src/parser/Makefile.am
unuran-1.8.1/src/parser/Makefile.in
unuran-1.8.1/src/parser/functparser_doc.dh
unuran-1.8.1/src/parser/make_stringparser.pl
unuran-1.8.1/src/parser/stringparser_doc.dh
unuran-1.8.1/src/specfunct/Makefile.am
unuran-1.8.1/src/specfunct/Makefile.in
unuran-1.8.1/src/tests/Makefile.am
unuran-1.8.1/src/tests/Makefile.in
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unuran-1.8.1/src/uniform/Makefile.in
unuran-1.8.1/src/uniform/fish.c
unuran-1.8.1/src/uniform/mrg31k3p.c
unuran-1.8.1/src/uniform/mstd.c
unuran-1.8.1/src/uniform/unuran_urng_gsl.h
unuran-1.8.1/src/uniform/unuran_urng_prng.h
unuran-1.8.1/src/uniform/unuran_urng_rngstreams.h
unuran-1.8.1/src/uniform/urng_builtin.c
unuran-1.8.1/src/uniform/urng_builtin.h
unuran-1.8.1/src/uniform/urng_fvoid.c
unuran-1.8.1/src/uniform/urng_fvoid.h
unuran-1.8.1/src/uniform/urng_gsl.c
unuran-1.8.1/src/uniform/urng_gsl.h
unuran-1.8.1/src/uniform/urng_gslqrng.c
unuran-1.8.1/src/uniform/urng_gslqrng.h
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unuran-1.8.1/src/uniform/urng_prng.h
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unuran-1.8.1/src/uniform/urng_randomshift.h
unuran-1.8.1/src/uniform/urng_rngstreams.c
unuran-1.8.1/src/uniform/urng_rngstreams.h
unuran-1.8.1/src/unuran.h.in
unuran-1.8.1/src/urng/Makefile.am
unuran-1.8.1/src/urng/Makefile.in
unuran-1.8.1/src/utills/Makefile.am
unuran-1.8.1/src/utills/Makefile.in
unuran-1.8.1/tests/Makefile.am
unuran-1.8.1/tests/Makefile.in
unuran-1.8.1/tests/README.conf
unuran-1.8.1/tests/make_test_files.pl
unuran-1.8.1/tests/t_arou.c
unuran-1.8.1/tests/t_arou.conf
unuran-1.8.1/tests/t_ars.c
unuran-1.8.1/tests/t_ars.conf
unuran-1.8.1/tests/t_auto.c
unuran-1.8.1/tests/t_auto.conf
unuran-1.8.1/tests/t_cext.c
unuran-1.8.1/tests/t_cext.conf
unuran-1.8.1/tests/t_cstd.c
unuran-1.8.1/tests/t_cstd.conf
unuran-1.8.1/tests/t_dari.c
unuran-1.8.1/tests/t_dari.conf
unuran-1.8.1/tests/t_dau.c
unuran-1.8.1/tests/t_dau.conf
unuran-1.8.1/tests/t_deprecated_tdrwg.c
unuran-1.8.1/tests/t_deprecated_vmt.c
unuran-1.8.1/tests/t_deprecated_vmt.conf
unuran-1.8.1/tests/t_dext.c
unuran-1.8.1/tests/t_dext.conf
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unuran-1.8.1/tests/t_distr_cemp.c
unuran-1.8.1/tests/t_distr_cemp.conf
unuran-1.8.1/tests/t_distr_condi.c
unuran-1.8.1/tests/t_distr_condi.conf
unuran-1.8.1/tests/t_distr_cont.c
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unuran-1.8.1/tests/t_distr_cvec.conf
unuran-1.8.1/tests/t_distr_cvemp.c
unuran-1.8.1/tests/t_distr_cvemp.conf
unuran-1.8.1/tests/t_distr_cxtrans.c
unuran-1.8.1/tests/t_distr_cxtrans.conf
unuran-1.8.1/tests/t_distr_discr.c
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unuran-1.8.1/tests/t_distr_matr.conf
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unuran-1.8.1/tests/t_gibbs.conf
unuran-1.8.1/tests/t_hinv.c
unuran-1.8.1/tests/t_hinv.conf
unuran-1.8.1/tests/t_hist.c
unuran-1.8.1/tests/t_hist.conf
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unuran-1.8.1/tests/t_hrb.c
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unuran-1.8.1/tests/t_itdr.c
unuran-1.8.1/tests/t_itdr.conf
unuran-1.8.1/tests/t_mcorr.c
unuran-1.8.1/tests/t_mcorr.conf
unuran-1.8.1/tests/t_mixt.c
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unuran-1.8.1/tests/t_nrou.conf
unuran-1.8.1/tests/t_pinv
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unuran-1.8.1/tests/t_pinv.c
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unuran-1.8.1/tests/t_srou.conf
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unuran-1.8.1/tests/t_stringparser.c
unuran-1.8.1/tests/t_stringparser.conf
unuran-1.8.1/tests/t_tabl.c
unuran-1.8.1/tests/t_tabl.conf
unuran-1.8.1/tests/t_tdr.c
unuran-1.8.1/tests/t_tdr.conf
unuran-1.8.1/tests/t_tdr_gw.c
unuran-1.8.1/tests/t_tdr_gw.conf
unuran-1.8.1/tests/t_tdr_ia.c
unuran-1.8.1/tests/t_tdr_ia.conf
unuran-1.8.1/tests/t_tdr_ps.c
unuran-1.8.1/tests/t_tdr_ps.conf
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unuran-1.8.1/tests/t_unif.conf
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unuran-1.8.1/tests/t_unur_error.conf
unuran-1.8.1/tests/t_unur_tests.c
unuran-1.8.1/tests/t_unur_tests.conf
unuran-1.8.1/tests/t_urng.c
unuran-1.8.1/tests/t_urng.conf
unuran-1.8.1/tests/t_utdr.c
unuran-1.8.1/tests/t_utdr.conf
unuran-1.8.1/tests/t_util_matrix.c
unuran-1.8.1/tests/t_util_matrix.conf
unuran-1.8.1/tests/t_vempk.c
unuran-1.8.1/tests/t_vempk.conf
unuran-1.8.1/tests/t_vnrou.c
unuran-1.8.1/tests/t_vnrou.conf
unuran-1.8.1/tests/t_x_gen.c
unuran-1.8.1/tests/t_x_gen.conf
unuran-1.8.1/tests/test_StdDistr.c
unuran-1.8.1/tests/test_StdDistr.m
unuran-1.8.1/tests/test_functionparser.c
unuran-1.8.1/tests/test_functionparser.m
unuran-1.8.1/tests/testcounter.c
unuran-1.8.1/tests/testdistributions/Makefile.am
unuran-1.8.1/tests/testdistributions/Makefile.in
unuran-1.8.1/tests/testdistributions/c_sawtooth_contpdf.c
unuran-1.8.1/tests/testdistributions/c_sawtooth_discpdf.c
unuran-1.8.1/tests/testdistributions/c_w_pdf_from_logpdf.c
unuran-1.8.1/tests/testdistributions/c_with_multiple_of_pdf.c
unuran-1.8.1/tests/testdistributions/c_wo_logpdf.c
unuran-1.8.1/tests/testdistributions/testdistributions.h
unuran-1.8.1/tests/testdistributions/vc_cauchy_RoU_ball.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_ar1.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_constantrho.c
unuran-1.8.1/tests/testdistributions/vc_w_marginals.c
unuran-1.8.1/tests/testdistributions/vc_wo_logpdf.c
unuran-1.8.1/tests/testroutines.c
unuran-1.8.1/tests/testunuran.h
unuran-1.8.1/src/distr/deprecated_distr.c
unuran-1.8.1/src/distr/deprecated_distr.h
unuran-1.8.1/src/methods/deprecated_methods.c
unuran-1.8.1/src/methods/deprecated_methods.h
unuran-1.8.1/src/methods/deprecated_tdrgw.h
unuran-1.8.1/src/methods/deprecated_vmt.c
unuran-1.8.1/src/methods/deprecated_vmt.h
```

```
unuran-1.8.1/src/methods/deprecated_vmt_struct.h
unuran-1.8.1/src/parser/stringparser_lists.ch.in
```

UNU.RAN relies on a modified version of the library Cephес, see ./src/src/specfunct/cephes\_source.h

Details from /src/src/specfunct/cephes\_source.h

=====

This file was considerably changed for UNU.RAN.  
As a consequence it has been renamed from "mconf.h" to  
"cephes\_source.h" to avoid confusion.

We were only interested in the files:

```
gamma.c
igamma.c
incbet.c
ndtr.c
ndtri.c
```

to use these files we needed the auxiliary files:

```
isnan.c
mtherr.c
polevl.c
```

The aim was to enhance portability for ANSI C without expert knowledge of the floating point unit.

The main changes are

numeric constants (in cephес - const.c) are replaced  
by macros defined in this file (source\_mconf.h).

We changed these constants using the constants provided by  
ANSI C in the math.h file.

We changed also the definitions of MAXGAM (in incbet.c) and of  
MAXSTIR (in gamma.c).

Everything concerning NANS and INFINITY was moved into isnan.c.  
(Also the defines to turn it off or on.)

We have only tested this version with NAN and INFINITY turned  
off, but we have not changed anything concerning that  
question. So turning this support on should (could) work.

March 26th, 2001, Josef Leydold and Wolfgang Hoermann.

/\*-----\*/

```
/*          mconf.h
 *
 * Common include file for math routines
 *
 *
 * SYNOPSIS:
 *
 * #include "mconf.h"
 *
 *
 * DESCRIPTION:
 *
 * This file contains definitions for error codes that are
 * passed to the common error handling routine mtherr()
 * (which see).
 *
 * The file also includes a conditional assembly definition
 * for the type of computer arithmetic (IEEE, DEC, Motorola
 * IEEE, or UNKnown).
 *
```

```
* For Digital Equipment PDP-11 and VAX computers, certain
* IBM systems, and others that use numbers with a 56-bit
* significand, the symbol DEC should be defined. In this
* mode, most floating point constants are given as arrays
* of octal integers to eliminate decimal to binary conversion
* errors that might be introduced by the compiler.
*
* For little-endian computers, such as IBM PC, that follow the
* IEEE Standard for Binary Floating Point Arithmetic (ANSI/IEEE
* Std 754-1985), the symbol IBMPC should be defined. These
* numbers have 53-bit significands. In this mode, constants
* are provided as arrays of hexadecimal 16 bit integers.
*
* Big-endian IEEE format is denoted MIEEE. On some RISC
* systems such as Sun SPARC, double precision constants
* must be stored on 8-byte address boundaries. Since integer
* arrays may be aligned differently, the MIEEE configuration
* may fail on such machines.
*
* To accommodate other types of computer arithmetic, all
* constants are also provided in a normal decimal radix
* which one can hope are correctly converted to a suitable
* format by the available C language compiler. To invoke
* this mode, define the symbol UNK.
*
* An important difference among these modes is a predefined
* set of machine arithmetic constants for each. The numbers
* MACHEP (the machine roundoff error), MAXNUM (largest number
* represented), and several other parameters are preset by
* the configuration symbol. Check the file const.c to
* ensure that these values are correct for your computer.
*
* Configurations NANS, INFINITIES, MINUSZERO, and DENORMAL
* may fail on many systems. Verify that they are supposed
* to work on your computer.
*/
```

Cephes Math Library Release 2.3: June, 1995  
Copyright 1984, 1987, 1989, 1995 by Stephen L. Moshier

Name: Decorator

```
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```

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Name: ID

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Name: L-BFGS-B

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License of L-BFGS-B (Fortran code)

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The version included here (in lbfgsb.f) is 3.0 (released April 25, 2011). It was written by Ciyou Zhu, Richard Byrd, and Jorge Nocedal <nocedal@ece.nwu.edu>. It carries the following condition for use:

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References

- \* R. H. Byrd, P. Lu and J. Nocedal. A Limited Memory Algorithm for Bound Constrained Optimization, (1995), SIAM Journal on Scientific and Statistical Computing, 16, 5, pp. 1190-1208.
- \* C. Zhu, R. H. Byrd and J. Nocedal. L-BFGS-B: Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (1997), ACM Transactions on Mathematical Software, 23, 4, pp. 550 - 560.
- \* J.L. Morales and J. Nocedal. L-BFGS-B: Remark on Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (2011), ACM Transactions on Mathematical Software, 38, 1.

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Name: LAPACK

Files: .libs/libopenb.so

Description: bundled in OpenBLAS

Availability: <https://github.com/xianyi/OpenBLAS/>

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Original algorithm for the implementation of rk\_interval function from Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by Magnus Jonsson.

Constants used in the rk\_double implementation by Isaku Wada.

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In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <http://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

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| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |
| 2.2            | 2.1.1        | 2001      | PSF        | yes                 |
| 2.1.2          | 2.1.1        | 2002      | PSF        | yes                 |
| 2.1.3          | 2.1.2        | 2002      | PSF        | yes                 |
| 2.2.1          | 2.2          | 2002      | PSF        | yes                 |
| 2.2.2          | 2.2.1        | 2002      | PSF        | yes                 |
| 2.2.3          | 2.2.2        | 2003      | PSF        | yes                 |
| 2.3            | 2.2.2        | 2002-2003 | PSF        | yes                 |
| 2.3.1          | 2.3          | 2002-2003 | PSF        | yes                 |
| 2.3.2          | 2.3.1        | 2002-2003 | PSF        | yes                 |
| 2.3.3          | 2.3.2        | 2002-2003 | PSF        | yes                 |
| 2.3.4          | 2.3.3        | 2004      | PSF        | yes                 |
| 2.3.5          | 2.3.4        | 2005      | PSF        | yes                 |
| 2.4            | 2.3          | 2004      | PSF        | yes                 |
| 2.4.1          | 2.4          | 2005      | PSF        | yes                 |
| 2.4.2          | 2.4.1        | 2005      | PSF        | yes                 |
| 2.4.3          | 2.4.2        | 2006      | PSF        | yes                 |
| 2.4.4          | 2.4.3        | 2006      | PSF        | yes                 |
| 2.5            | 2.4          | 2006      | PSF        | yes                 |
| 2.5.1          | 2.5          | 2007      | PSF        | yes                 |
| 2.5.2          | 2.5.1        | 2008      | PSF        | yes                 |
| 2.5.3          | 2.5.2        | 2008      | PSF        | yes                 |
| 2.6            | 2.5          | 2008      | PSF        | yes                 |
| 2.6.1          | 2.6          | 2008      | PSF        | yes                 |
| 2.6.2          | 2.6.1        | 2009      | PSF        | yes                 |
| 2.6.3          | 2.6.2        | 2009      | PSF        | yes                 |
| 2.6.4          | 2.6.3        | 2009      | PSF        | yes                 |
| 2.6.5          | 2.6.4        | 2010      | PSF        | yes                 |
| 2.7            | 2.6          | 2010      | PSF        | yes                 |

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Original algorithm for the implementation of `rk_interval` function from Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by Magnus Jonsson.

Constants used in the `rk_double` implementation by Isaku Wada.

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== `pcg64` (embedded)

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PCG Random Number Generation for C.

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Adapted from a C++ implementation of Chris Doty-Humphrey's SFC PRNG.

<https://gist.github.com/imneme/flf7821f07cf76504a97f6537c818083>

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Name: Faddeeva  
Files: scipy/special/Faddeeva.\*  
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Files: scipy/fft/\_pocketfft/[pocketfft.h, pypocketfft.cxx]  
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Name: ampgo  
Files: benchmarks/benchmarks/go\_benchmark\_functions/\*.py  
License: MIT  
Functions for testing global optimizers, forked from the AMPGO project,  
<https://code.google.com/archive/p/ampgo>

Name: pybind11  
Files: no source files are included, however pybind11 binary artifacts are included with every binary build of SciPy.  
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Files: scipy/stats/biasedurn/\*  
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Name: UNU.RAN  
Files: scipy/\_lib/unuran/\*  
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Files: scipy/stats/\_rcont/[logfactorial.h,logfactorial.c]  
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== biasedurn

----- Forwarded message -----

From: Agner Fog <agner@agner.org>  
Date: Wed, Jul 22, 2020 at 8:54 PM  
Subject: Re: Add BiasedUrn to SciPy?  
To: Matt Haberland <mhaberland@calpoly.edu>  
Cc: Warren Weckesser <warren.weckesser@gmail.com>

Dear Matt The C++ code for these distributions without binding to the R project are available here:

<https://www.agner.org/random/stocc.zip>

You have my permission to use it in SciPy under the new BSD license.

Best regards,

Agner Fog

On 22/07/2020 17.05, Matt Haberland wrote:

Hi Agner, I'm a maintainer of the Python scientific computing library SciPy, and I'm working on improving the capabilities of our statistics subpackage `scipy.stats`. We'd like to add both Fisher's and Wallenius' noncentral hypergeometric distributions, but these look quite challenging to implement. We found your BiasedUrn package, and we'd love to wrap it, but we can't include GPL-3 licensed code under our BSD-new license. Would you consider re-licensing BiasedUrn under a more permissive license, such as BSD-new or MIT, so we can include it in SciPy?

Thank you for considering it!

Matt

--

Matt Haberland  
Assistant Professor  
BioResource and Agricultural Engineering  
08A-3K, Cal Poly

==uru.ran

Permission was granted on 23 March 2021 by Josef Leydold (josef.leydold@wu.ac.at) and Wolfgang Hoermann (hormannw@bound.edu.tr)

to use the UNU.RAN code excluding the uniform random number generator in `src/uniform/mrg31k3p.c` (copyright by Renee Touzin)

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- unuran-1.8.1/COPYING
- unuran-1.8.1/INSTALL
- unuran-1.8.1/Makefile.am
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- unuran-1.8.1/acinclude.m4
- unuran-1.8.1/aclocal.m4
- unuran-1.8.1/autoconf/config.guess
- unuran-1.8.1/autoconf/config.sub

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unuran-1.8.1/autoconf/install-sh
unuran-1.8.1/autoconf/ltmain.sh
unuran-1.8.1/autoconf/mdate-sh
unuran-1.8.1/autoconf/missing
unuran-1.8.1/autogen.sh
unuran-1.8.1/configure
unuran-1.8.1/doc/Makefile.am
unuran-1.8.1/doc/Makefile.in
unuran-1.8.1/doc/figures/Makefile.am
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unuran-1.8.1/doc/figures/discrete_inversion.txt
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unuran-1.8.1/tests/t_gibbs.conf
unuran-1.8.1/tests/t_hinv.c
unuran-1.8.1/tests/t_hinv.conf
unuran-1.8.1/tests/t_hist.c
```

```
unuran-1.8.1/tests/t_hist.conf
unuran-1.8.1/tests/t_hitro.c
unuran-1.8.1/tests/t_hrb.c
unuran-1.8.1/tests/t_hrb.conf
unuran-1.8.1/tests/t_hrd.c
unuran-1.8.1/tests/t_hrd.conf
unuran-1.8.1/tests/t_hri.c
unuran-1.8.1/tests/t_hri.conf
unuran-1.8.1/tests/t_info.c
unuran-1.8.1/tests/t_info.conf
unuran-1.8.1/tests/t_itdr.c
unuran-1.8.1/tests/t_itdr.conf
unuran-1.8.1/tests/t_mcorr.c
unuran-1.8.1/tests/t_mcorr.conf
unuran-1.8.1/tests/t_mixt.c
unuran-1.8.1/tests/t_mvstd.c
unuran-1.8.1/tests/t_mvstd.conf
unuran-1.8.1/tests/t_mvtdr.c
unuran-1.8.1/tests/t_ninv.c
unuran-1.8.1/tests/t_ninv.conf
unuran-1.8.1/tests/t_norta.c
unuran-1.8.1/tests/t_norta.conf
unuran-1.8.1/tests/t_nrou.c
unuran-1.8.1/tests/t_nrou.conf
unuran-1.8.1/tests/t_pinv
unuran-1.8.1/tests/t_pinv.c
unuran-1.8.1/tests/t_srou.c
unuran-1.8.1/tests/t_srou.conf
unuran-1.8.1/tests/t_ssr.c
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unuran-1.8.1/tests/t_util_matrix.conf
unuran-1.8.1/tests/t_vempk.c
unuran-1.8.1/tests/t_vempk.conf
unuran-1.8.1/tests/t_vnrou.c
unuran-1.8.1/tests/t_vnrou.conf
unuran-1.8.1/tests/t_x_gen.c
unuran-1.8.1/tests/t_x_gen.conf
unuran-1.8.1/tests/test_StdDistr.c
unuran-1.8.1/tests/test_StdDistr.m
```

```
unuran-1.8.1/tests/test_functionparser.c
unuran-1.8.1/tests/test_functionparser.m
unuran-1.8.1/tests/testcounter.c
unuran-1.8.1/tests/testdistributions/Makefile.am
unuran-1.8.1/tests/testdistributions/Makefile.in
unuran-1.8.1/tests/testdistributions/c_sawtooth_contpdf.c
unuran-1.8.1/tests/testdistributions/c_sawtooth_discpdf.c
unuran-1.8.1/tests/testdistributions/c_w_pdf_from_logpdf.c
unuran-1.8.1/tests/testdistributions/c_with_multiple_of_pdf.c
unuran-1.8.1/tests/testdistributions/c_wo_logpdf.c
unuran-1.8.1/tests/testdistributions/testdistributions.h
unuran-1.8.1/tests/testdistributions/vc_cauchy_RoU_ball.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_ar1.c
unuran-1.8.1/tests/testdistributions/vc_special_correlations_constantrho.c
unuran-1.8.1/tests/testdistributions/vc_w_marginals.c
unuran-1.8.1/tests/testdistributions/vc_wo_logpdf.c
unuran-1.8.1/tests/testroutines.c
unuran-1.8.1/tests/testunuran.h
unuran-1.8.1/src/distr/deprecated_distr.c
unuran-1.8.1/src/distr/deprecated_distr.h
unuran-1.8.1/src/methods/deprecated_methods.c
unuran-1.8.1/src/methods/deprecated_methods.h
unuran-1.8.1/src/methods/deprecated_tdrwg.h
unuran-1.8.1/src/methods/deprecated_vmt.c
unuran-1.8.1/src/methods/deprecated_vmt.h
unuran-1.8.1/src/methods/deprecated_vmt_struct.h
unuran-1.8.1/src/parser/stringparser_lists.ch.in
```

UNU.RAN relies on a modified version of the library Cephes, see `./src/src/specfunct/cephes_source.h`

UNU.RAN relies on a modified version of the library Cephes, see `./src/src/specfunct/cephes_source.h`

Details from `/src/src/specfunct/cephes_source.h`

=====

This file was considerably changed for UNU.RAN.  
As a consequence it has been renamed from "mconf.h" to  
"cephes\_source.h" to avoid confusion.

We were only interested in the files:

```
gamma.c
igamma.c
incbet.c
ndtr.c
ndtri.c
```

to use these files we needed the auxiliary files:

```
isnan.c
mtherr.c
polevl.c
```

The aim was to enhance portability for ANSI C without expert knowledge of the floating point unit.

The main changes are

```
numeric constants (in cephes - const.c) are replaced
by macros defined in this file (source_mconf.h).
We changed these constants using the constants provided by
ANSI C in the math.h file.
We changed also the definitions of MAXGAM (in incbet.c) and of
MAXSTIR (in gamma.c).
Everything concerning NANS and INFINITY was moved into isnan.c.
(Also the defines to turn it off or on.)
We have only tested this version with NAN and INFINITY turned
off, but we have not changed anything concerning that
```

question. So turning this support on should (could) work.  
March 26th, 2001, Josef Leydold and Wolfgang Hoermann.

```
/*-----*/  
  
/*          mconf.h  
*  
*   Common include file for math routines  
*  
*  
* SYNOPSIS:  
*  
* #include "mconf.h"  
*  
*  
* DESCRIPTION:  
*  
* This file contains definitions for error codes that are  
* passed to the common error handling routine mtherr()  
* (which see).  
*  
* The file also includes a conditional assembly definition  
* for the type of computer arithmetic (IEEE, DEC, Motorola  
* IEEE, or UNKnown).  
*  
* For Digital Equipment PDP-11 and VAX computers, certain  
* IBM systems, and others that use numbers with a 56-bit  
* significand, the symbol DEC should be defined. In this  
* mode, most floating point constants are given as arrays  
* of octal integers to eliminate decimal to binary conversion  
* errors that might be introduced by the compiler.  
*  
* For little-endian computers, such as IBM PC, that follow the  
* IEEE Standard for Binary Floating Point Arithmetic (ANSI/IEEE  
* Std 754-1985), the symbol IBMPC should be defined. These  
* numbers have 53-bit significands. In this mode, constants  
* are provided as arrays of hexadecimal 16 bit integers.  
*  
* Big-endian IEEE format is denoted MIEEE. On some RISC  
* systems such as Sun SPARC, double precision constants  
* must be stored on 8-byte address boundaries. Since integer  
* arrays may be aligned differently, the MIEEE configuration  
* may fail on such machines.  
*  
* To accommodate other types of computer arithmetic, all  
* constants are also provided in a normal decimal radix  
* which one can hope are correctly converted to a suitable  
* format by the available C language compiler. To invoke  
* this mode, define the symbol UNK.  
*  
* An important difference among these modes is a predefined  
* set of machine arithmetic constants for each. The numbers  
* MACHEP (the machine roundoff error), MAXNUM (largest number  
* represented), and several other parameters are preset by  
* the configuration symbol. Check the file const.c to  
* ensure that these values are correct for your computer.  
*  
* Configurations NANS, INFINITIES, MINUSZERO, and DENORMAL  
* may fail on many systems. Verify that they are supposed  
* to work on your computer.
```

\*/

Cephes Math Library Release 2.3: June, 1995  
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=====

The version included here (in lbfgsb.f) is 3.0 (released April 25, 2011). It was written by Ciyou Zhu, Richard Byrd, and Jorge Nocedal <nocedal@ece.nwu.edu>. It carries the following condition for use:

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References

- \* R. H. Byrd, P. Lu and J. Nocedal. A Limited Memory Algorithm for Bound Constrained Optimization, (1995), SIAM Journal on Scientific and Statistical Computing, 16, 5, pp. 1190-1208.
- \* C. Zhu, R. H. Byrd and J. Nocedal. L-BFGS-B: Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (1997), ACM Transactions on Mathematical Software, 23, 4, pp. 550 - 560.
- \* J.L. Morales and J. Nocedal. L-BFGS-B: Remark on Algorithm 778: L-BFGS-B, FORTRAN routines for large scale bound constrained optimization (2011), ACM Transactions on Mathematical Software, 38, 1.

"""

The Python wrapper  
=====

This code uses F2PY (<http://cens.ioc.ee/projects/f2py2e/>) to generate the wrapper around the Fortran code.

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-----  
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The rk\_random and rk\_seed functions algorithms and the original design of the Mersenne Twister RNG:

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Original algorithm for the implementation of rk\_interval function from Richard J. Wagner's implementation of the Mersenne Twister RNG, optimised by Magnus Jonsson.

Constants used in the rk\_double implementation by Isaku Wada.

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A. HISTORY OF THE SOFTWARE

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Python was created in the early 1990s by Guido van Rossum at Stichting Mathematisch Centrum (CWI, see <https://www.cwi.nl>) in the Netherlands as a successor of a language called ABC. Guido remains Python's principal author, although it includes many contributions from others.

In 1995, Guido continued his work on Python at the Corporation for National Research Initiatives (CNRI, see <https://www.cnri.reston.va.us>) in Reston, Virginia where he released several versions of the software.

In May 2000, Guido and the Python core development team moved to BeOpen.com to form the BeOpen PythonLabs team. In October of the same year, the PythonLabs team moved to Digital Creations, which became Zope Corporation. In 2001, the Python Software Foundation (PSF, see <https://www.python.org/psf/>) was formed, a non-profit organization created specifically to own Python-related Intellectual Property. Zope Corporation was a sponsoring member of the PSF.

All Python releases are Open Source (see <https://opensource.org> for

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| Release        | Derived from | Year      | Owner      | GPL-compatible? (1) |
|----------------|--------------|-----------|------------|---------------------|
| 0.9.0 thru 1.2 |              | 1991-1995 | CWI        | yes                 |
| 1.3 thru 1.5.2 | 1.2          | 1995-1999 | CNRI       | yes                 |
| 1.6            | 1.5.2        | 2000      | CNRI       | no                  |
| 2.0            | 1.6          | 2000      | BeOpen.com | no                  |
| 1.6.1          | 1.6          | 2001      | CNRI       | yes (2)             |
| 2.1            | 2.0+1.6.1    | 2001      | PSF        | no                  |
| 2.0.1          | 2.0+1.6.1    | 2001      | PSF        | yes                 |
| 2.1.1          | 2.1+2.0.1    | 2001      | PSF        | yes                 |
| 2.1.2          | 2.1.1        | 2002      | PSF        | yes                 |
| 2.1.3          | 2.1.2        | 2002      | PSF        | yes                 |
| 2.2 and above  | 2.1.1        | 2001-now  | PSF        | yes                 |

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