Subject: Re: random numbers with gamma distribution
Posted by davidf on Wed, 04 Nov 1998 08:00:00 GMT
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Stein Vidar Hagfors Haugan (steinhh@ulrik.uio.no) writes:

> Read his post one more time, David - and open your eyes this time :-)

Sigh... I'm officially retired. :-(

Cheers,

David

David Fanning, Ph.D.
Fanning Software Consulting
E-Mail: davidf@dfanning.com
Phone: 970-221-0438, Toll-Free Book Orders: 1-888-461-0155
Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: random numbers with gamma distribution
Posted by steinhh on Wed, 04 Nov 1998 08:00:00 GMT
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In article <MPG.10aa14fba7d2a20d989703@news.frii.com> davidf@dfanning.com \
(David Fanning) writes:

> T.Osborn (f055@uea.ac.uk) writes:
>
>> I'm trying to generate a random series that has a gamma distribution, using
>> the randomu() function with the gamma keyword. The online help says to set
>> gamma to an integer > 0. WHY DOES IT HAVE TO BE AN INTEGER? The gamma
>> distribution is in fact defined for all gamma > 0, not just integers.
>> I want to set gamma=0.5, which currently fails as it converts it to the
>> integer 0, which is not > 0, and so it fails.
>>
>> Is this a bug, and is there any work-around?
>
> Which gamma function are you running? Certainly not IDL's
> GAMMA function which works perfectly well with non-integer
> values:
>
> IDL> print, gamma(0.5)
> % Compiled module: GAMMA.
> 1.77245

:-)

Read his post one more time, David - and open your eyes this time :-)

A number of useful options have been added to the RANDOMU function
since I (we?) "learned" it. I don't know which version added the stuff,
but you can now generate random numbers with various distributions
(poisson, binomial, gamma, normal, uniform) straight away by setting
some keywords. The /NORMAL keyword gives you the same as RANDOMN.

As far as I can make out a gamma distribution is proportional to

```
  x^(g-1)*exp(-x)
  --------------
     (g-1)
```

From the formula you wouldn't expect any problems with g being
fractional...since x is always positive. But I guess the
implementation is easier if g is restricted to integers...

Regards,

Stein Vidar

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Note: A copy of this article was e-mailed to the original poster.

Subject: Re: random numbers with gamma distribution
Posted by Alejandro C. Frery on Mon, 09 Nov 1998 08:00:00 GMT
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In fact T. Osborn is right, IDL only generates gamma deviates with integer shape parameter. This may be due to the fact that it is easier to compute this kind of Gamma random variables, since they are the sum of independent exponentially distributed ones, and these are generated by a simple transformation of uniform random variables.
I'll soon post a program that generates outcomes from arbitrary Gamma distributed random variables but, in the meantime, some references on this topic are

```
@book{devro86,
   author = {L. Devroye},
   address = {New York},
   publisher = {Springer-Verlag},
   title = {Non-uniform random variate generation},
   year = {1986}
}
@book{buseu92,
   author = {Bustos, O. H. and A. C. Frery},
   address = {Rio de Janeiro, RJ, Brazil},
   publisher = {CNPq/IMPA},
   series = {Monografias de Matem\'atica, 49},
   title = {Simula\c{c}\~{a}o estoc\'{a}stica: teoria e algoritmos
(vers\~{a}o completa)},
   year = {1992}
}
```

Alejandro

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Tel: +55-81-2718430 # 3324 Fax: +55-81-2718438

David Fanning escreveu na mensagem ...
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