

Re: Geometrically distributed random numbers on Rabbit 2000.

Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2005-06/msg01123.html>

- *From:* Jonathan Kirwan <jkirwan@xxxxxxxxxxxxxxxx>
 - *Date:* Wed, 08 Jun 2005 16:59:01 GMT
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On Wed, 08 Jun 2005 23:18:30 +1000, The Real Andy
<will_get_back_to_you_on_This> wrote:

><snip>

>The knuth algorithm I have mentioned is for a uniformly distributed
>RNG. It was already approved by the government regulator for use in
>gaming applications, hence the reason for using it.

If you test the algorithm that Westhues and I mention, note that I did NOT copy it correctly from the book and he did. I had glanced casually at the marks and misread the bars there. So use the CEIL function he mentions, though it may work similarly either way (I've not thought it through.)

Otherwise, the algorithm mentioned in the exercise I pointed out is quite simple. You imagine a circle centered inside a square and sized so that it just touches the sides of the square. Then select only quadrant 1 to work with and ignore the rest. Then imagine two uniform deviates from 0 to 1, with one of them taken as the x-axis and the other as the y-axis. Then:

- (1) get two random uniform deviates U and V,
- (2) if $U^2+V^2 \geq 1$ then goto 1, else X is set to U.

The number of executions of step 2 has the geometric distribution., with a minimum of 1 time, an average of $4/\pi$ times, a maximum of infinity, and a deviation of $(4/\pi)*(\text{SQRT}(1-\pi/4))$.

Get the book.

Jon

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- *References:*
 - ◆ *Geometrically distributed random numbers on Rabbit 2000.*

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