
Subject: Re: Normal Distributed Random Numbers
Posted by [thompson](#) on Tue, 04 Sep 2001 21:34:40 GMT
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"Kay Bente" <KBente@lycos.de> writes:

> Hi
> I have to create arrays with normal distributed random numbers, but with
> variable FWHM (Full width half max/standard deviation sigma?).
> I want to add normal distributed noise to an image, so that the values
> differ around a mean value.
> In IDL there is a procedure to create such arrays RandomN, but you can't
> change the FWHM and I can't find what FWHM the normal distribution there
> has.

> So I would be glad If someone can tell me how to create such arrays (maybe
> outof uniform distributed arrays created with RandomU, I have no idea.
> I'm using IDL 5.4

The RANDOMN() function creates a Gaussian distribution with an average of 0,
and a standard deviation of 1. Mathematically, this is written as

$$\text{EXP}(-0.5 \cdot X^2)$$

If you want a different distribution, e.g. a different average or a different
standard deviation, all you need to do is something

$$\text{RanVals} = \text{AvgVal} + \text{Sigma} \cdot \text{RANDOMN}(\text{Seed}, \text{Num})$$

For example,

$$\text{RanVals} = 500 + 3 \cdot \text{RANDOMN}(\text{Seed}, 10000)$$

would produce a bunch of random numbers with an average value of 500, and a
standard deviation of 3. In other words, most of the numbers would be between
497 and 503.

(The FWHM of this distribution is $2 \cdot \text{Sigma} \cdot \text{SQRT}(2 \cdot \text{ALOG}(2))$, or about $2.35 \cdot \text{Sigma}$,
but I suspect you're really thinking about the standard deviation Sigma rather
than the FWHM.)

William Thompson
