

## Random Numbers from Normal Distribution with Specific Mean and Variance

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This example shows how to create an array of random floating-point numbers that are drawn from a normal distribution having a mean of 500 and variance of 25.

The `randn` function returns a sample of random numbers from a normal distribution with mean 0 and variance 1. The general theory of random variables states that if  $x$  is a random variable whose mean is  $\mu_x$  and variance is  $\sigma_x^2$ , then the random variable,  $y$ , defined by  $y = ax + b$ , where  $a$  and  $b$  are constants, has mean  $\mu_y = a\mu_x + b$  and variance  $\sigma_y^2 = a^2\sigma_x^2$ . You can apply this concept to get a sample of normally distributed random numbers with mean 500 and variance 25.

First, initialize the random number generator to make the results in this example repeatable.

```
rng(0, 'twister');
```

Create a vector of 1000 random values drawn from a normal distribution with a mean of 500 and a standard deviation of 5.

```
a = 5;  
b = 500;  
y = a.*randn(1000,1) + b;
```

Calculate the sample mean, standard deviation, and variance.

```
stats = [mean(y) std(y) var(y)]  
stats =
```

```
499.8368    4.9948    24.9483
```

The mean and variance are not 500 and 25 exactly because they are calculated from a sampling of the distribution.