MITx: 14.310x Data Analysis for Social Scientists

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Error in answer for Question 20 in Homework 4?

question posted 6 days ago by joycevdev

The command I thought was right was marked wrong, even though it appears to work in R. I made a histogram of my results in R also, which seem to confirm that my idea works. I have not looked at the answer because I have one submission left. Could you check the answer? Could there be more than one possibility?

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4 responses

joycevdev

5 days ago

Still hoping for direction on this question.

? Error in answer for Question 20 in Homework 4? 8

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joycevdev

3 days ago

The most obvious and straightforward answer (the one I referred to above) was marked wrong. I have googled other options and have found Box-Muller and Ziggurat algorithms. There are R commands available for these for download online (or I can write R code for them), but they are not part of standard R. Should we be considering these sorts of options for the final question of HW4?

Add a comment

joycevdev

3 days ago

I gave up waiting for a response and just re-entered my first answer to Question 20 of HW4. The answer that is given doesn't work at all. It certainly doesn't transform a draw of 1000 uniformly distributed numbers into 1000 normally distributed numbers. If there is some way to make that answer work, please send the R code that shows this happening once the HW deadline has passed. I would like to understand.

port

Add a comment

Roman-Andres-Zarate Staff

3 days ago

Sorry about the delay replying you back. Can you tell us what answer did you send and we can check whether it is correct or not. The answer in the homework just follows the method developed by Sara in the lectures: we use the inverse of the CDF to generate a sample of random numbers following a normal distribution, from the random draw of the uniform distribution.

My first answer was log because of the code below:

```
size=1000; u = runif(size) v = runif(size) x=rep(0,size)
y=rep(0,size) for (i in 1:size){ + x[i] =
sqrt(-2*log(u[i]))*cos(2*pi*v[i]) + y[i] =
sqrt(-2*log(u[i]))*sin(2*pi*v[i]) + } hist(x) hist(y)
```

Then I found a reference to a Ziggurat implementation, rziggurat, but I decided that was probably too complicated. After that I guessed maybe your question meant, how do you transform *the code* to change the draw of random numbers into a draw of uniform random numbers rather than the numbers themselves. So then I went with rnorm, which is the simplest change to the code. I'm not at all clear how qnorm can work to do this job. The help in R just says:

For qnorm, the code is a C translation of Wichura, M. J. (1988) Algorithm AS 241: The percentage points of the normal distribution. Applied Statistics, 37, 477–484. which provides precise results up to about 16 digits.

and I could not find this article online. Can you tell me more about qnorm so I can better understand the answer? Or perhaps point me to a reference that might describe its use more clearly?

posted 2 days ago by joycevdev

Hello, qnorm is the function in R that gives you the inverse of the CDF. Remember what Sara did in the lecture: for any random variable X, regardless of its distribution, we have that $F_X(x) \sim U[0,1]$. Thus, if we have a random sample that comes from the standard uniform distribution, we can get a random sample of the variable X by applying the inverse of the CDF. In R, qnorm() is the quantile function of the normal distribution. This means that it is the inverse of the CDF. Then, we can create a random sample that follows the normal distribution by applying this function to the random sample of the uniform distribution we have generated before. Let me know if this does make sense.

posted 2 days ago by Roman-Andres-Zarate Staff

Sup

Hi Roman, yes the method you describe makes sense. I didn't see the relationship between that method and the function qnorm - the help for that function is so useless! But now I do see how it can be used to solve the problem, in addition to the other possible ways of creating a set of numbers drawn from a standardized normal distribution.

posted 2 days ago by joycevdev

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