Easy Inverse Test for Assignment 2

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Al Warren · a month ago

Here's an easy visual test for inverse. The digits remain the same but the signs switch columns.

```
m <- matrix(c(-1, -2, 1, 1), 2,2)
x <- makeCacheMatrix(m)
x$get()
     [,1] [,2]
[1,]   -1    1
[2,]   -2    1

inv <- cacheSolve(x)
inv
     [,1] [,2]
[1,]    1   -1
[2,]    2   -1

> inv <- cacheSolve(x)
getting cached data
> inv
     [,1] [,2]
[1,]    1   -1
[2,]    2   -1
```

(This isn't about discussing mathematics and matrices. It's just an easy visual test using simple integers.)

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Scott McElroy · a month ago

So basically if the number is negative, you make it positive, and if it's positive, you make it negative. That's the whole trick to the inverse of a matrix?

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 Stephen J Maguire Signature Track · a month ago

Ahh, no.

If you let %*% be the symbol for matrix multiplication then m_inv is the inverse of m if m %*% m_inv is the identity matrix. There are inverses only for square matrices (i.e. nrows = ncols). If m has dimensions (a,a), the relevant identity matrix has 1 for I[i,i] (on the diagonal) and 0 for I[i,j] when i is not j (the off-diagonal entries).

The importance of the identity matrix is that for any a by a matrix m, m %*% I = I %*% m = I, Because m %*% m_inv = I, you can solve equations like A %*% B = C as A = C %*% B_inv. (The standard algebra method is A %*% B = C implies that A %*% B %*% B_inv = C %*% B_inv and A %*% (B %*% B_inv) = A %*% I = A.)

I took this class a couple of years ago and vaguely remember that we were led to a technique for solving some inversion problems, and were promised that the method would work with the matrices that we were expected to solve. I'm sure there will be a method revealed in time to do the problem. You should probably take a look at the very beginning chapter or two of a Linear Algebra (or Matrix Algebra) class to remind yourself how matrix multiplication works. This is stuff that is covered in high school Algebra II or Pre-Calculus classes.

Good luck.

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Nick Kallfa Signature Track · a month ago

There is a nice and easy formula for the inversion of a 2x2 matrix.

If this is our matrix: $M = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$

then the formula for computing the inverse is $\frac{1}{ad - bc} * \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

and if you remember determinants of a matrix, that formula is the same thing as the following

$$\frac{1}{\text{Determinant of M}} * \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

There are formula for the inverse of a 3x3 and a 4x4 matrix, but trust me you do not want to memorize them. There are easier ways to compute these.

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Alice Townes Signature Track · 18 days ago

This video explains the comment above in long form: https://www.youtube.com/watch?

v=CBi8SyXRn1Q

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+ Comment

 Al Warren · a month ago

The example I listed was just an easy visual reference using solve(). Numbers and math really didn't have anything to do with it.

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Nick Kallfa Signature Track · a month ago

Woops I meant to respond to Scott and Steven's comments

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 Al Warren · a month ago

That's ok. But solve() handles all the math for you. It even throws an error if the matrix isn't invertible. Have a look at the docs - https://stat.ethz.ch/R-manual/R-devel/library/base/html/solve.html

Check out the description for the second argument:
"*If missing, b is taken to be an identity matrix and solve will return the inverse of a.*"

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Patricia Bohl Signature Track · 25 days ago

thanks a lot, helpful thread for me!!! i overthought a lot, in the end i just took the vector example and did some slight modifications...

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