

lecture_12

February 28, 2017

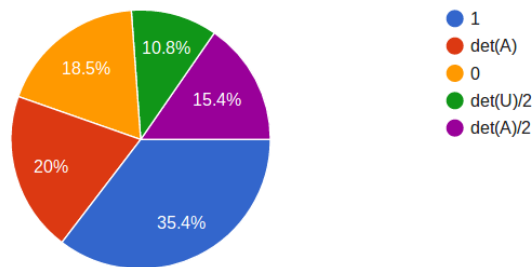
```
In [27]: %plot --format svg
```

```
In [28]: setdefaults
```

0.1 My question from last class

When a matrix A is decomposed into the lower triangular and upper triangular matrices, L and U , respectively. What is the determinant of L ?

(65 responses)



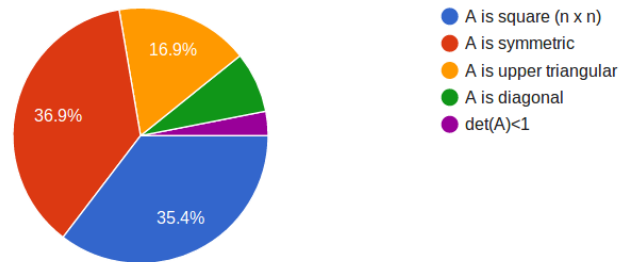
q1

0.2 Your questions from last class

1. Will the exam be more theoretical or problem based?
2. Writing code is difficult
3. What format can we expect for the midterm?
4. Could we go over some example questions for the exam?
5. Will the use of GitHub be tested on the Midterm exam? Or is it more focused on linear algebra techniques/what was covered in the lectures?
6. This is not my strong suit, getting a bit overwhelmed with matrix multiplication.
7. I forgot how much I learned in linear algebra.
8. What's the most exciting project you've ever worked on with Matlab/Octave?

The Cholesky factorization simplifies the process of LU-decomposition with a predefined formula to calculate U where $\text{transpose}(U) \cdot U = A$. What are the prerequisites for this factorization?

(65 responses)



q2

1 Matrix Inverse and Condition

Considering the same solution set:

$$y = Ax$$

If we know that $A^{-1}A = I$, then

$$A^{-1}y = A^{-1}Ax = x$$

so

$$x = A^{-1}y$$

Where, A^{-1} is the inverse of matrix A .

$$2x_1 + x_2 = 1$$

$$x_1 + 3x_2 = 1$$

$$Ax = y$$

$$\begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$A^{-1} = \frac{1}{2 \cdot 3 - 1 \cdot 1} \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 3/5 & -1/5 \\ -1/5 & 2/5 \end{bmatrix}$$

In [2]: $A = [2, 1; 1, 3]$

$\text{invA} = 1/5 * [3, -1; -1, 2]$

$A * \text{invA}$

$\text{invA} * A$

A =

```
2  1
1  3
```

invA =

```
0.60000  -0.20000
-0.20000  0.40000
```