Lab 3: Visualization of a System of Equations   **Spring 2022**

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First   *Last*

Lab 3: Visualization of Systems of Equations

As a convenience, this **answer template** is provided if you wish to easily submit your work. Be sure to save it as a PDF before submitting online!

Note: You must also submit a copy of your MATLAB Live script to receive full grades.

System of Equations #1: $A\vec{x} = \vec{b}$
$1 \cdot x_1 + 2 \cdot x_2 - 3 \cdot x_3 = +2$
$2 \cdot x_1 + 1 \cdot x_2 - 3 \cdot x_3 = -2$

Question 1: Paste your <u>code</u> using **fprintf** and **size** here.

```
fprintf("The size of the augmented matrix is: %d x %d\n", size(AM))
```

Question 2: Paste your reduced matrix named RAM here.

Solution: $RAM = \begin{bmatrix} 1 & 0 & -1 & -2 \\ 0 & 1 & -1 & 2 \end{bmatrix}$

Question 3: Paste your <u>code</u> to find the pivot column for row 2 here.
ANSWER:
```
pivot_for_row2 = find(RAM(2,:), 1);
```

Question 4: Write the solutions

Question 4: Complete this <u>multiline</u> comment to give the solutions.
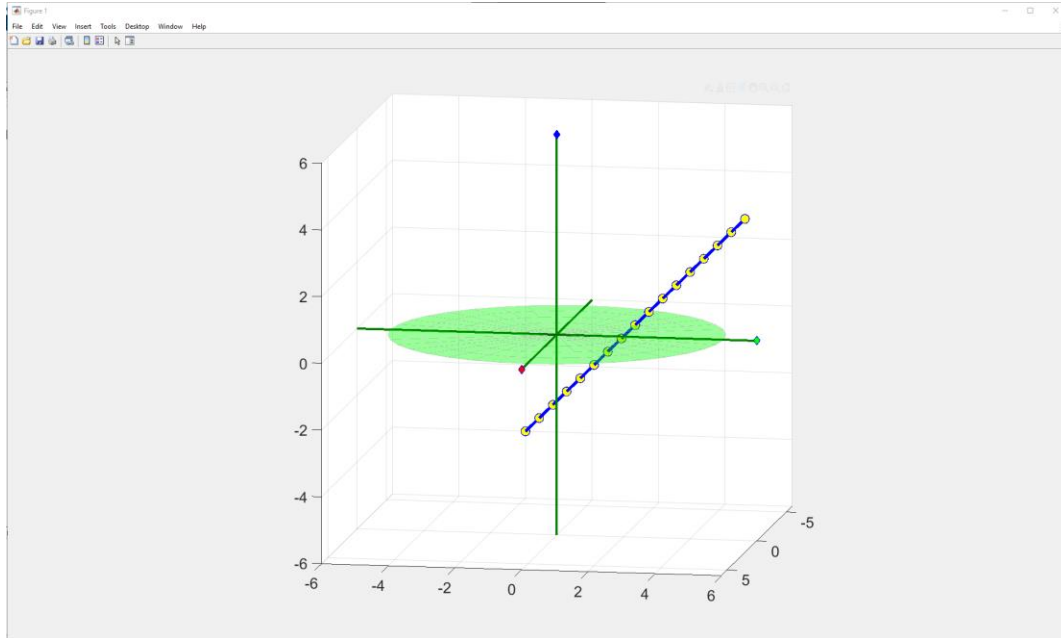Just add the missing information after each colon.
```
%{
    The basic variables are:      x1, x2
    The free variable is:         x3
    The solutions can be written: x1=x3-2 , x2=x3+2 where x3 is free.
%}
```

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Questions 5 and 6: <u>Replace</u> the sample graph with <u>your</u> graph so far. The sample was for a different system. Your solution line will NOT be vertical.

Questions 7-8: Once <u>both</u> planes are added, paste in either an **X-Z view** or **a Y-Z** view using any colormap you like. Both planes should be clearly visible.**Grader will award one point for <u>each</u> plane.**
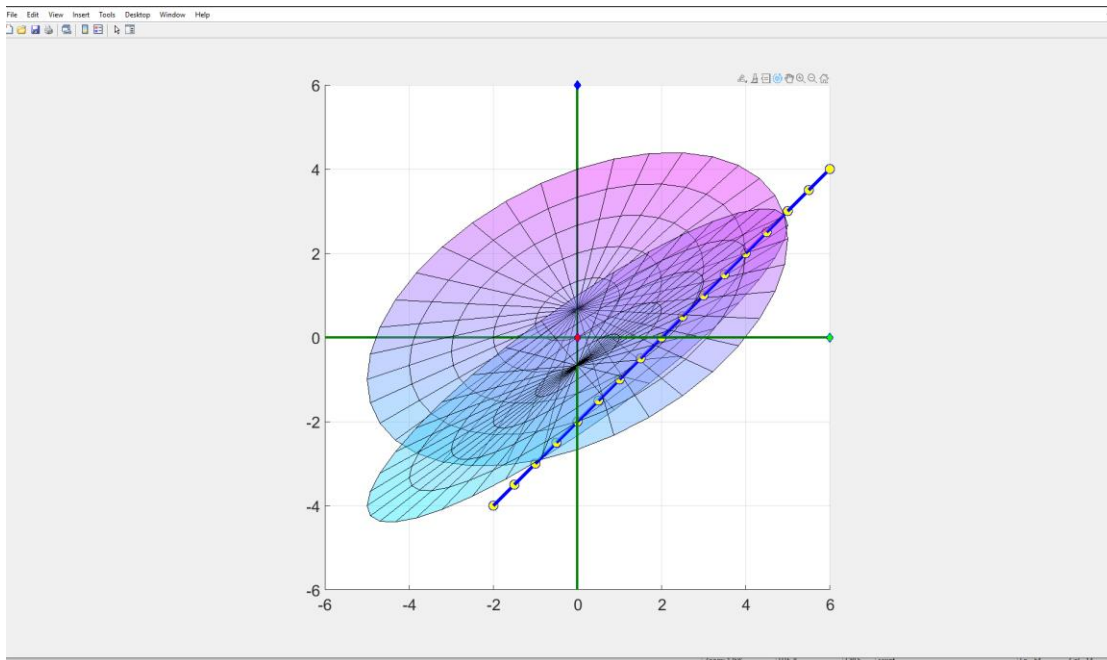
Question 9: Add your fully reduced matrices for **System #2** and for **System #3**
Grader will pick one at random and award one point if it is correct.

Question 9a: Paste your reduced augmented matrix for system #2 here.

$$RAM2 = \begin{bmatrix} 1 & 0 & -1 & 0 \\ 0 & 1 & -1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$ Is it consistent? **NO**

Question 9b: Paste your reduced augmented matrix for system #3 here.

$$RAM3 = \begin{bmatrix} 1 & 0 & -1 & -2 \\ 0 & 1 & -1 & 2 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$ Do system #1 and system #3 have the exact same solutions?

Question 10: Paste your <u>code</u> to spin your masterpiece here!!

```
N = 2; % Number of complete revolutions of the azimuth. Elevation fixed at 20.
elevation = 20

for k =0:1:360*N
    view([k, elevation])
    pause(0.05)
end
```

Ready to Submit?
Be sure all ten questions are answered. When your lab is complete, be sure to submit three files:
1. Your **completed Answer Template** as a PDF file
2. A copy of your **MATLAB Live Script**
3. A **PDF** copy of your **MATLAB Live Script** (Save-Export to PDF…)

The due date is the day after your lab section by **11:59pm** to receive full credit. You have one more day, to submit the lab (but with a small penalty), and then the window closes for good and your grade will be zero.