

Solving Systems of Linear Algebraic Equations in MATLAB



No AI use

Time required: 90 minutes

Analyzing electric circuits can be accomplished by solving sets of equations. For a particular circuit, the voltages V_1 , V_2 , and V_3 are found through the system;

$$V_1 + V_2 = 5$$

$$-6V_1 + 10V_2 - 3V_3 = 0$$

$$-V_2 + 51V_3 = 0$$

Put these equations in matrix form and solve in MATLAB.

1. **Define the Coefficient Matrix \mathbf{A} :** The matrix \mathbf{A} is defined based on the coefficients of V_1 , V_2 , and V_3 in the given equations.
2. **Define the Constants Vector \mathbf{b} :** The vector \mathbf{b} is defined based on the constants on the right-hand side of the equations.
3. **Solve the System:** The system of equations $\mathbf{AV}=\mathbf{b}$ is solved using MATLAB's backslash operator (`\`). This operator is used to solve linear systems efficiently. ($V = \mathbf{A} \setminus \mathbf{b}$)
4. **Display the Results:** The solution vector \mathbf{V} contains the values of V_1 , V_2 , and V_3 . The results are displayed using the **disp** and the **num2str** function.

Example run:

```
The voltages are:  
V1 = 3.1181  
V2 = 1.8819  
V3 = 0.0369
```

Assignment Submission

1. Submit properly named and commented script files.
2. Attach a screenshot of the Command Window showing the successful execution of each script.

3. Attach all to the assignment in Blackboard.