3. Solve homogeneous system
Solving homogeneous equations with MATLAB (External resource)

(1.0 points possible)

Backslash and homogeneous equations

Previously, we saw that to solve a linear system $\mathbf{Ax} = \mathbf{b}$ for $\mathbf{x}$ using MATLAB, one uses the following command.

```
x = A\b;
```

Let's see what happens when we use this approach for the homogeneous equation $\mathbf{Ax} = \mathbf{0}$, where the 4×5 matrix $\mathbf{A}$ is given by

```
A = [ -0.7950   -2.3851   -0.9578    0.1628   -0.1628;
      -0.1236   -0.3708   -0.8113    0.6877   -0.6877;
      -0.5517   -1.6551    0.5935   -1.1452    1.1452;
       0.3406    1.0219   -0.1154    0.4560   -0.4560];
```

Solve for

```
  x
```

and then find the dimension of the nullspace, in a variable called

```
  dim
```

To do this, it may be helpful to use the function **`zeros( )`**, which creates an $m \times n$ matrix (or vector) using by typing:

```
zeros(m,n);
```

Your Script

Save Reset MATLAB Documentation (https://www.mathworks.com/help/)

```
%Copy the matrix A below
A = [ -0.7950   -2.3851   -0.9578    0.1628   -0.1628;
      -0.1236   -0.3708   -0.8113    0.6877   -0.6877;
      -0.5517   -1.6551    0.5935   -1.1452    1.1452;
       0.3406    1.0219   -0.1154    0.4560   -0.4560];
%Use the backslash command to solve for x

x = A\zeros(4,1)

% Find the dimension of the nullspace to see if this makes any sense.
% Store the dimension in a variable called dim
% Hint first run the code (commenting out the line below), then enter a number.
```

```
dim = size(null(A),2)


```

▶ Run Script ()

Assessment: Correct Submit ()

- A copied correctly
- x solved for correctly

Find a nonzero solution (External resource) (1.0 points possible)

Find a nonzero solution

Find any nonzero solution $\mathbf{x} \neq \mathbf{0}$ to the homogeneous linear equation $\mathbf{Ax} = \mathbf{0}$, where the matrix $\mathbf{A}$ is given by is the same as the matrix in the proble above:

```
A = [ -0.7950   -2.3851   -0.9578    0.1628   -0.1628;
      -0.1236   -0.3708   -0.8113    0.6877   -0.6877;
      -0.5517   -1.6551    0.5935   -1.1452    1.1452;
       0.3406    1.0219   -0.1154    0.4560   -0.4560];
```

Check you answer by creating a vector

```
b=A*x
```

Your Script

Save Reset MATLAB Documentation (https://www.mathworks.com/help/)

```
1  %Find a nonzero solution x to Ax=0.
2
3  A = [ -0.7950   -2.3851   -0.9578    0.1628   -0.1628;
4        -0.1236   -0.3708   -0.8113    0.6877   -0.6877;
5        -0.5517   -1.6551    0.5935   -1.1452    1.1452;
6         0.3406    1.0219   -0.1154    0.4560   -0.4560];
7
8  nA = null(A)
9  x = nA(:,1);
10 %Check that x is a solution:
11 b = A*x
```

▶ Run Script ()

Assessment: Correct

Submit ()

Check that x is a non-zero solution

3. Solve homogeneous system

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A\b
When I do A\b, I'm just getting the zero vector as a solution. How do you get matlab to give you the ot... 3

Is this something I should worry about
For the first part, I got all the green checks, but the output had a long dialogue beginning with: [Warni... 3