MATLAB IS A MATRIX CALCULATOR!
MATrix + LABoratory = MATLAB

MATRICES
What is a matrix?
A matrix is an arrangement of rows and columns,
Like this
\[
A = \begin{bmatrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{bmatrix}
\]
One can see that this has 3 rows and 3 columns i.e. it is a 3 by 3 matrix.

FOR MATLAB EVERYTHING IS A MATRIX,
Question: Is scalar number “5” a matrix for MATLAB?
Answer: Yes number “5” is a 1 by 1 matrix.
Creating a matrix is as easy as making a vector, using semicolons (;) to separate the rows of a matrix.
If we type
\[
A = \begin{bmatrix}
1 & 2 & 3 \\
4 & 5 & 6 \\
7 & 8 & 9
\end{bmatrix}
\]
Matlab will receive a matrix A in workspace.
If we do A+Enter MATLAB will give what is stored in “A”.
One area in which MATLAB excels is matrix computation.
We can easily find the transpose of the matrix 'A'.

\[
B = A'
\]

Now let's multiply these two matrices together.
Note again that MATLAB doesn't require you to deal with matrices as a collection of numbers. MATLAB knows when you are dealing with matrices and adjusts your calculations accordingly.

\[
C = A \times B
\]

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- 19 -
Let's find the inverse of a matrix ...

\[ X = \text{inv}(A) \]

and then illustrate the fact that a matrix times its inverse is the identity matrix.

\[ I = \text{inv}(A) \times A \]

MATLAB has functions for nearly every type of common matrix calculation.

Some Basic Matrix Operations

First, let's create a simple vector with 9 elements called 'a'.

\[ a = [1 \ 2 \ 3 \ 4 \ 6 \ 4 \ 3 \ 4 \ 5] \]

Now let's add 2 to each element of our vector, 'a', and store the result in a new vector.
Notice how MATLAB requires no special handling of vector or matrix math.

\[ b = a + 2 \]