Inverse and Transpose

The **inverse** of a matrix A is denoted A^{-1}. Multiplying by the inverse results in the identity matrix.

A non square matrix does not have an inverse matrix. We can compute inverses of matrices in octave with the $pinv(A)$ function and in Matlab with the $inv(A)$ function. Matrices that don't have an inverse are *singular* or *degenerate*.

The **transposition** of a matrix is like rotating the matrix 90° in clockwise direction and then reversing it. We can compute transposition of matrices in matlab with the transpose(A) function or A':

$$A = \begin{bmatrix} a & b & c & d & e & f \end{bmatrix}$$

$$A^T = \begin{bmatrix} a & c & e & b & d & f \end{bmatrix}$$

In other words:

$$A_{ij} = A^T_{ji}$$

```
1    % Initialize matrix A
2    A = [1,2,0;0,5,6;7,0,9]
3
4    % Transpose A
5    A_trans = A'
6
7    % Take the inverse of A
8    A_inv = inv(A)
9
10   % What is A^(-1)*A?
11   A_invA = inv(A)*A
12
13
```

Run

Reset

```
A =

   1   2   0
   0   5   6
   7   0   9

A_trans =

   1   0   7
   2   5   0
   0   6   9

A_inv =

   0.348837  -0.139535   0.093023
   0.325581   0.069767  -0.046512
  -0.271318   0.108527   0.038760

A_invA =

   1.00000  -0.00000   0.00000
   0.00000   1.00000  -0.00000
  -0.00000   0.00000   1.00000
```

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