

# 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 =

120

056

709

A\_trans =

107

250

069

A\_inv =

0.348837-0.1395350.093023

0.3255810.069767-0.046512

-0.2713180.1085270.038760

A\_invA =

1.00000-0.000000.00000

0.000001.00000-0.00000

-0.000000.000001.00000

✓ Complete