Octave Commands for Linear Algebra

Making vectors: Unless otherwise specified, variables are row vectors (1 x n arrays).

Here are examples of ways to form vectors. Try them:

- b = [1 2 3 4]
- b = b'
- xx = 0:.1:2
- yy = linspace(0,3,13)

Making matrices:

- A = [1 2 3; 4 5 6]
- C = eye(3)
- D = ones(4)
- E = zeros(5,3)
- F = rand(2,3)
- G = randn(5)
- H = hilb(5)
- P = pascal(4)
- Commands for other speciality matrices include: gallery, hadamard, hankel, invhilb, magic, rosser, toeplitz, vander, wilkinson.

Basic operations:

- B = A' for matrix multiplication, the number of columns in the first one should be = to the number of rows in the second time
- A*C
- C*A .....Will not work, C is 3 by 3 and A is 2 by 3.
- x = P \ b .....SolvesPx=b.
- P*x .....Checks the previous command.

Some specialty commands

Learn
- Matrix multiplication
- Inverse matrices
- Identity matrix

- [m n] = size(A)
- P = pascal(5), p = diag(P)
- diag(p)
- flipud(A)
- fliplr(A)

- v = randn(10,1), a = abs(v)
- s = sort(v), m = max(v)
- norm(v)
- norm(eye(4))
- D, N = Null(D), D*N
- rank(D)
- det(D)
- trace(D)
- inv(G), N*G, G*N
- cond(H)

Element-wise Operations

B = A'

• A.*A …… Gives square of all the elements in A.

• A.^2 …… Also gives the square of all the elements in A.

• C.*A ……Gives element-wise multiplication of C and A.

• P ./b …… Divide each element in P by b.

•

Some matrix decompostions:

- [L U P] = lu(G)
- [V m] = eig(G)
- [U T] = schur(G)
- [Q R] = qr(G)
- [U S V] = svd(G)