MatLab Commands

Roots of a Polynomial

```
>> roots([1 0 -3 0 -4]); # for the polynomial x^4 - 3x^2 - 4
```

Create a [Matrix](#) or Vector

```
>> [ a11 a12 ; a21 a22 ]
```

[Matrix Transpose](#)

```
>> transpose(A) # or
>> A.'
```

[Matrix Determinant](#)

```
>> det(matrixName)
```

[Inverse Matrix](#)

```
>> inv(matrixName)
```

[Eigenvalues and Eigenvectors](#)

```
>> [V D] = eig(A); # V are eigenvectors, D are eigenvalues
>> eig(A); # eigenvalues only
```

Solution of [Linear System of Equations](#) Ax = b

```
>> x = A/b
```

[LU Decomposition](#)

```
>> [L U P] = lu(A)
```

[Forwards Substitution](#)

We probably don't need to know this, but it was given in a solution sheet so I'm writing it down.

```
>> function X=forsub(A, B)
>>     n=length(B);
```

```
>>      X=zeros(n,1);
>>      X(1)=B(1)/A(1, 1);
>>      for k=2:n
>>              X(k)=(B(k)-A(k, 1:k-1) * X(1:k-1))/A(k,k);
>>      end

>> Y = forsub(L, P*B)
```

Backwards Substitution

We probably don't need to know this, but it was given in a solution sheet so I'm writing it down.

```
>> function X=backsub(A, B)
>>      n=length(B);
>>      X=zeros(n, 1);
>>      X(n) = B(n)/A(n,n);
>>      for k=n-1:-1:1
>>              X(k) = (B(k) - A(k, k+1:n)*X(k+1:n))/A(k,k);
>>      end

>> X = backsub(U, Y)
```

Cholesky Factorization

```
>> U = Chol(A)
>> L = transpose(U) # or U.'
```