FFT Discrete Fourier transform.
FFT(X) is the discrete Fourier transform (DFT) of vector X. For matrices, the FFT operation is applied to each column. For N-D arrays, the FFT operation operates on the first non-singleton dimension.

FFT(X,N) is the N-point FFT, padded with zeros if X has less than N points and truncated if it has more.

FFT(X,[],DIM) or FFT(X,N,DIM) applies the FFT operation across the dimension DIM.

For length N input vector x, the DFT is a length N vector X, with elements

$$X(k) = \sum_{n=1}^{N} x(n)*\exp(-j*2*pi*(k-1)*(n-1)/N), \quad 1 <= k <= N.$$

The inverse DFT (computed by IFFT) is given by

$$x(n) = (1/N) \sum_{k=1}^{N} X(k)*\exp(j*2*pi*(k-1)*(n-1)/N), \quad 1 <= n <= N.$$

The relationship between the DFT and the Fourier coefficients a and b in

$$x(n) = a0 + \sum_{k=1}^{N/2} a(k)*\cos(2*pi*k*t(n)/(N*dt))+b(k)*\sin(2*pi*k*t(n)/(N*dt))$$

is

$$a0 = X(1)/N, \quad a(k) = 2*real(X(k+1))/N, \quad b(k) = -2*imag(X(k+1))/N,$$

where x is a length N discrete signal sampled at times t with spacing dt.

See also IFFT, FFT2, IFFT2, FFTSHIFT.