

Demo 2 Cheat Sheet: Wave Decomposition

Numpy : Numerical Vectors and arrays (np)

Function	Purpose	Inputs	Usage
zeros	Return a new array of given shape and type, filled with zeros.	shape = number or numbers	<code>x=np.zeros(5)</code> <code>x=np.zeros((5,5))</code>
arange	Return an array evenly spaced values within a given interval according to a step size.	start, stop, step_size	<code>x = np.arange(-1.0,1.0, 0.1)</code>
linspace	Return an array of evenly spaced numbers over a specified interval.	start, stop, num	<code>x = np.arange(-1.0,1.0, 100)</code>
pi	the value of pi.		<code>np.pi</code>
double	Convert a number or integer in to a floating number (decimals).	number	<code>np.double(3)</code>
sin	sinusoidal wave	number or vector	<code>y = np.sin(x)</code>
concatenate	Join a sequence of arrays together.	(x1, x2, ...)	<code>x = np.concatenate((x1,x2))</code>

Matplotlib : Plotting (plt)

Function	Purpose	Inputs	Usage
plot	Plot lines	x, y	<code>plt.plot(x,y)</code>
xlabel	Set the x axis label of the current plot.	name	<code>plt.xlabel("Axis x name")</code>
title	Set a title of the current plot.	name	<code>plt.title("Plot name")</code>
show	Display a figure.		<code>plt.show()</code>

Scipy : Scientific python (sp)

Function	Purpose	Inputs	Usage
quad	Compute a definite integral between an interval.	func, start, end, extra args for function	<code>sp.integrate.quad(np.sin , 0 , np.pi , args=())</code>

Demo Specific - Common variables:

`x==avector`
`L==thelengthofatriangle`
`n==thenumberofaneigenstate`
`max_num==thenumberofapproximation.`

Function	Purpose	Inputs	Usage
triangle_function	triangle function	x, L	<code>triangle_function(x, 1.0)</code>
projection_integrand	integrand between projection of eigenstates and triangle.	x, n, L	use with quad
inner_product_function	integrand between eigenstates.	x, n1, n2	use with quad
analytical_solution	analytical solution to triangle function.	x, max_num	<code>analytical_solution(x, 50)</code>