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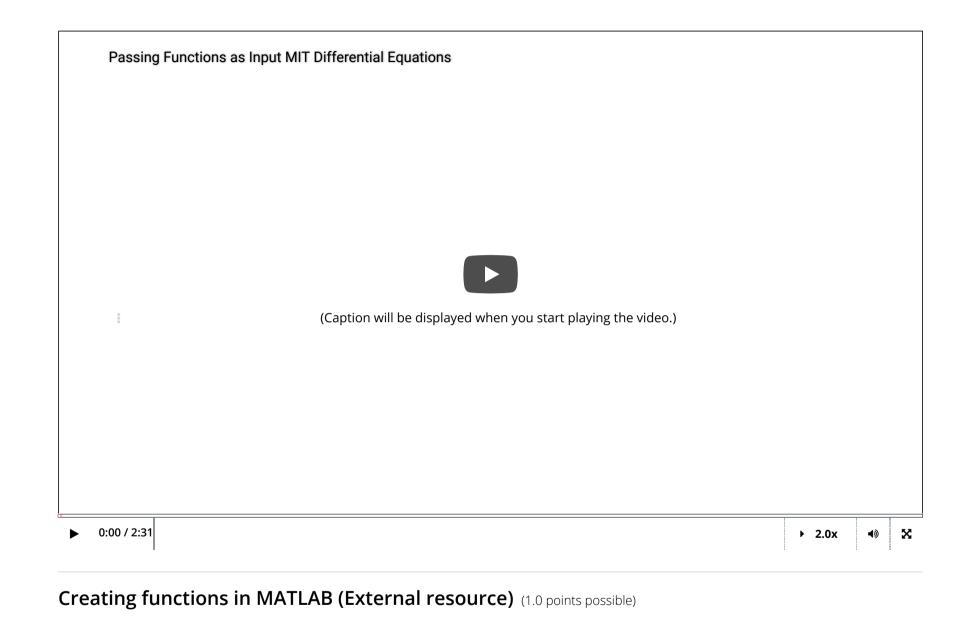
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# 3. Integrals in MATLAB Passing functions as input



# Integrals take functions as input

MATLAB can integrate functions. The syntax for numerical integration is

```
integral(fun,xmin,xmax);
```

where fun is an input function, xmin is the lower limit of the integral, and xmax is the upper limit.

In this problem, you will use numerical integration to compute 2 Fourier coefficients of 2 different input functions.

- 1. Find the Fourier coefficient  $b_{61}$  of the  $2\pi$  periodic sawtooth wave defined by f(t) = t on the interval  $-\pi < t < \pi$
- 2. Find the Fourier coefficient  $a_{77}$  of the  $2\pi$  periodic triangle wave defined by g(t) = |t|, on the interval  $-\pi < t < \pi$

NOTE: To compute the Fourier coefficients, you are going to integrate the product of two functions of *t*. For this to make sense in MATLAB, you must use the "dot times" operation.

.\*

The command for |t| in MATLAB is

abs(t)

# Script @

16

```
%Create the function(s) you will need to compute the following coefficients.

p = @(t) t.*sin(61*t);
q = @(t) abs(t).*cos(77*t);

%Find the coefficient b61 of the sawtooth wave.
7 %(Don't forget the correct constant multiple.)
8 %b61 = (1/pi)*integral(p,-pi,pi);
9 b61 = (2/pi)*integral(p,0,pi); % odd

%Find the coefficient a77 of the triangle wave.
%(Don't forget the correct constant multiple.)
%A77 = (1/pi)*integral(q,-pi,pi);
a77 = (2/pi)*integral(q,0,pi); %even
```



#### **Previous Assessment: All Tests Passed**

Do all these lectures available on you tube? Can you provide me the link? Regards

Submit

- Check coefficient b61
- Check coefficient a77

#### Output

## 3. Integrals in MATLAB

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Show all posts by recent activity ▼ Error in passing a function as input In the third line, I have p = @(t) t\*sin(61\*t); but I am getting below error. Is my syntax for defining function incorrect? Error using \* Incorrect dimensions for matrix multiplicati... ? right code 5 hi do anyone has the right code? i tried so many times but i did not get a right answer unable to multiply 2 functions 3 > I tried using the .\* command for 2 functions, @p and @g; p=@(t) t q= @(t) sin(61\*t) r = @(t) p\*.q I got this error message: Undefined function 'times' for input arguments of t... ☑ It is an Odd function? 2 The sawtooth is an Odd function, then I concluded that it affected directly the a0 and an's coefficients, correct? Att. Ricardo ? Only -ve coefficients The magnitude of my coefficients is correct but they are all negative unless I adjust p = @(t) sawtooth(\*\*t\*\*), \*sin(61\*t) to be p = @(t) sawtooth(\*\*t-pi\*\*), \*sin(61\*t), Even then I... ? Youtube link

Function handles don't work as expected in MATLAB
When I created my function handles, it complained that the dimensions of the matrices didn't match. I ended up having to use ".\\*" instead of "\\*". It appears that it's assumin...

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