3. Integrals in MATLAB
Passing functions as input

Passing Functions as Input MIT Differential Equations

(Caption will be displayed when you start playing the video.)

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2.0x

Creating functions in MATLAB (External resource) (1.0 points possible)

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 2π periodic sawtooth wave defined by $f(t) = t$ on the interval $-\pi < t < \pi$
2. Find the Fourier coefficient a_{77} of the 2π 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

Save Reset MATLAB Documentation (https://www.mathworks.com/help/)

```
%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.
%(Don't forget the correct constant multiple.)
%b61 = (1/pi)*integral(p,-pi,pi);
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


```

Run Script

Previous Assessment: All Tests Passed

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- Check coefficient b61
- Check coefficient a77

Output

3. Integrals in MATLAB

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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...	4
right code hi do anyone has the right code? i tried so many times but i did not get a right answer	5
unable to multiply 2 functions > I tried using the .* command for 2 functions, @p and @q: 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...	3
It is an Odd function? The sawtooth is an Odd function, then I concluded that it affected directly the a0 and an's coefficients, correct? Att. Ricardo	2
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...	7
Youtube link Do all these lectures available on you tube? Can you provide me the link? Regards	8

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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