1. Utilize the MATLAB® implementation of the Fourier Series approximation of an even square wave (that you developed in Module 2), to develop a function M-file called “sq_wave_fourier_fn_LastName.m”. The input arguments are to be “freq,” “time,” and “N”; where freq = square wave frequency in Hz, time = vector of time points, N = number of terms in the Fourier Series approximation. The output of the function is the approximation of the square wave. Then create a driver program called “sq_wave_driver_LastName.m” that generates three different approximations (for N = 3, 9 and 29) of a 1 Hz square wave and plots them on three separate subplots. Obviously your driver program should call your function m-file to generate the approximations.

Answer

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sq_wave_fourier_fn_Musil.m

```
function [] = sq_wave_fourier_fn_Musil(frequency, Time, N)
%OPTIMAL Plot of fourier approximation of a square wave
%   Detailed explanation goes here

tic


% Specify frequency of the square wave in Hz and radians
freq = frequency;
omega = 2*pi*freq;

% Specify time vector for simulation
```

sq_wave_driver_Musil.m

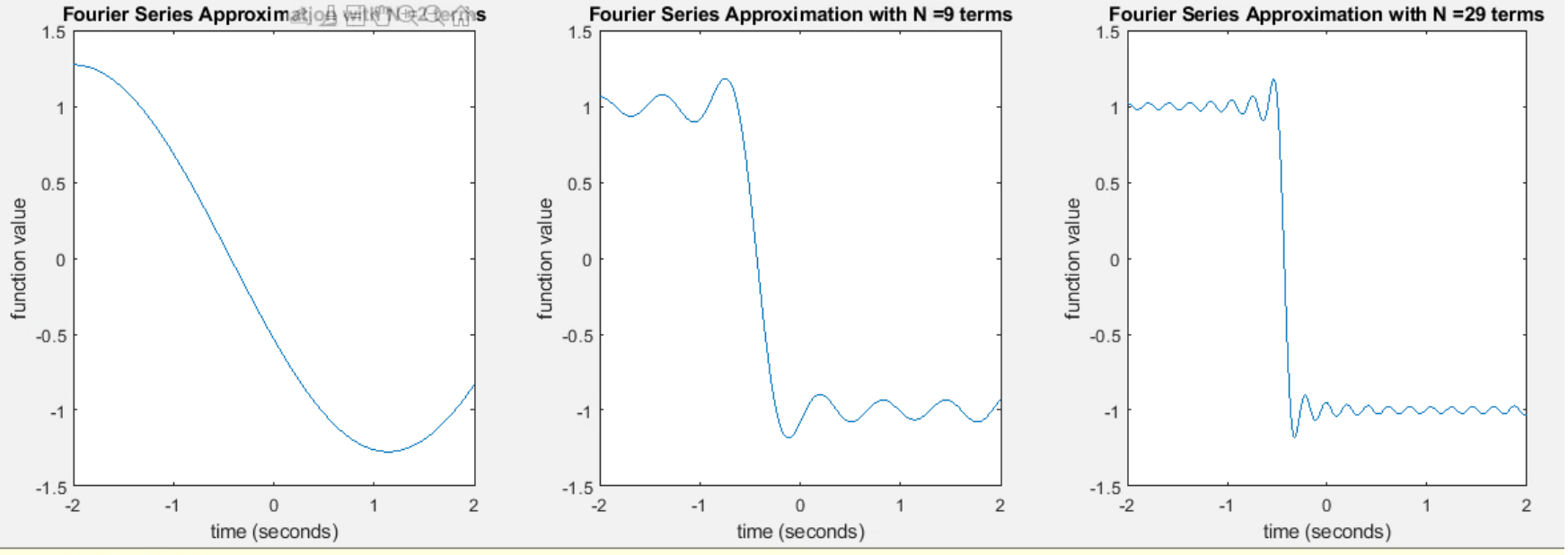
```
tstep = 0.001;

time = -2:tstep:2;
frequency_ = 1;
N = [2, 9, 29];

for n = 1:length(N)
    subplot(1,3,n)
    sq_wave_fourier_fn_Musil(frequency_, time, N(n))
end
```

Figure 1

File Edit View Insert Tools Desktop Window Help



2. Similar to the helix example described in MATLAB®'s help information for PLOT3, create a 3D plot of the following parametric function:

$$x(t) = e^{\frac{t}{10}} \sin(t)$$

$$y(t) = e^{\frac{t}{10}} \cos(t)$$

$$z(t) = t$$

Your program should be named "helix_driver.m" and should create five different views of the function: MATLAB® default 3D view, MATLAB® default 2D view, the X-Z plane, the Y-Z plane, and a customized view of your choice that you have decided provides the most accurate 3D view of the function. Remember the command 'figure', issued all by itself, creates a new figure window without destroying previously existing figures.