PulseTrain Computes trigonometric Fourier series for a Pulse Train with

Table of Contents

Period T=2 seconds so w = pi rad/sec for this even function. 1
A= 1 and width tau = 1 so tau/T = 0.5; Duty cycle = 0.5 1
Plot Trig series over 3 cycles,% then Exponential series. 1
Input Number of Harmonics; Press a key at Pause 1
Computes exponential Fourier series for Rectangular Pulse Train. 2
Used to compare results from Trig series and Exponential 2

Period T=2 seconds so w = pi rad/sec for this even function.

A= 1 and width tau = 1 so tau/T = 0.5; Duty cycle = 0.5

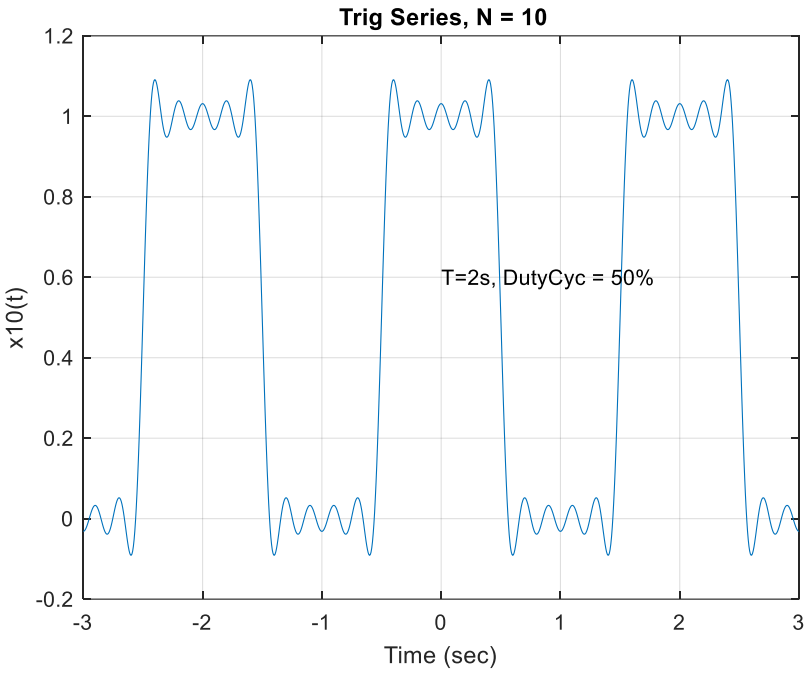
Plot Trig series over 3 cycles,% then

Exponential series.

Input Number of Harmonics; Press a key at Pause

```
clear all,clf
A = 1.0; %Amplitude
t = -3:6/1000:3; % Plot 6 sec, 3 cycles
N = input('Number of harmonics ');
c0 = A* 0.5; % Duty cycle * Amplitude
w0 = pi;  % f = 1/2; T=2
xN = c0*ones(1,length(t));  % dc component added to each term
for k=1:2:N,                % Even harmonics are zero -ignore them.
   xN = xN + (2/k/pi)*sin(k*pi/2)*cos(k*w0*t); % Sum the components
end
figure(1)
plot(t,xN),grid ON
title([' Trig Series, N = ',num2str(N)])  % Print number of harmonics
xlabel('Time (sec)')
ylabel(['x',num2str(N),'(t)'])
txt = 'T=2s, DutyCyc = 50%';
text(0,0.6,txt)

fprintf('  Press a Key  ')
pause
```



Computes exponential Fourier series for Rectangular Pulse Train

Used to compare results from Trig series and Exponential

```
t = -3:6/1000:3;
% Use N harmonics input
c0 = 0.5;
w0 = pi;
xN = c0*ones(1,length(t));    % dc component
for k=1:N,
  ck = 1/k/pi*sin(k*pi/2);
  c_k = ck;
  xN = xN + ck*exp(j*k*w0*t) + c_k*exp(-j*k*w0*t);
end
figure (2)
plot(t,xN),grid ON
title([' Complex Series, N = ',num2str(N)])
xlabel('Time (sec)')
ylabel(['x',num2str(N),'(t)'])
txt = 'T=2s, DutyCyc = 50%';
text(0,0.6,txt)
```

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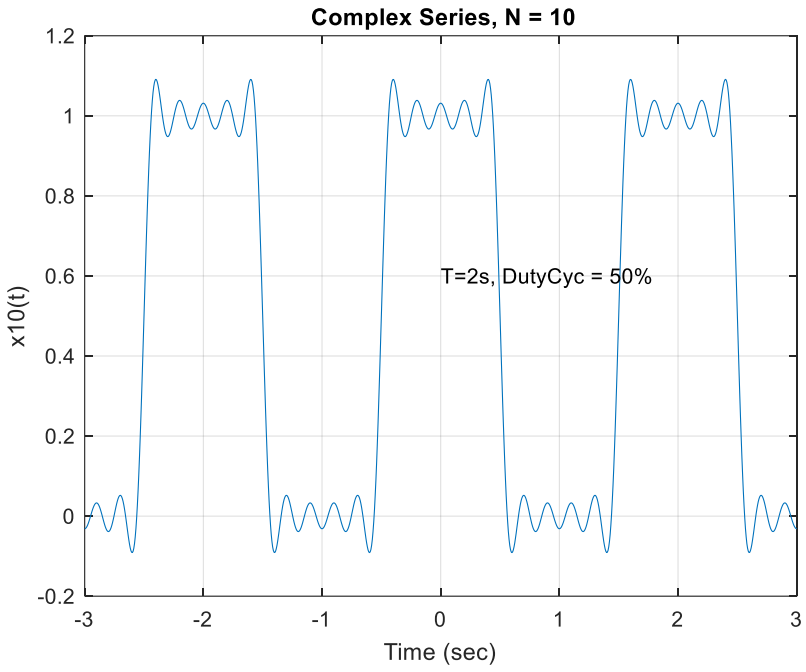

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