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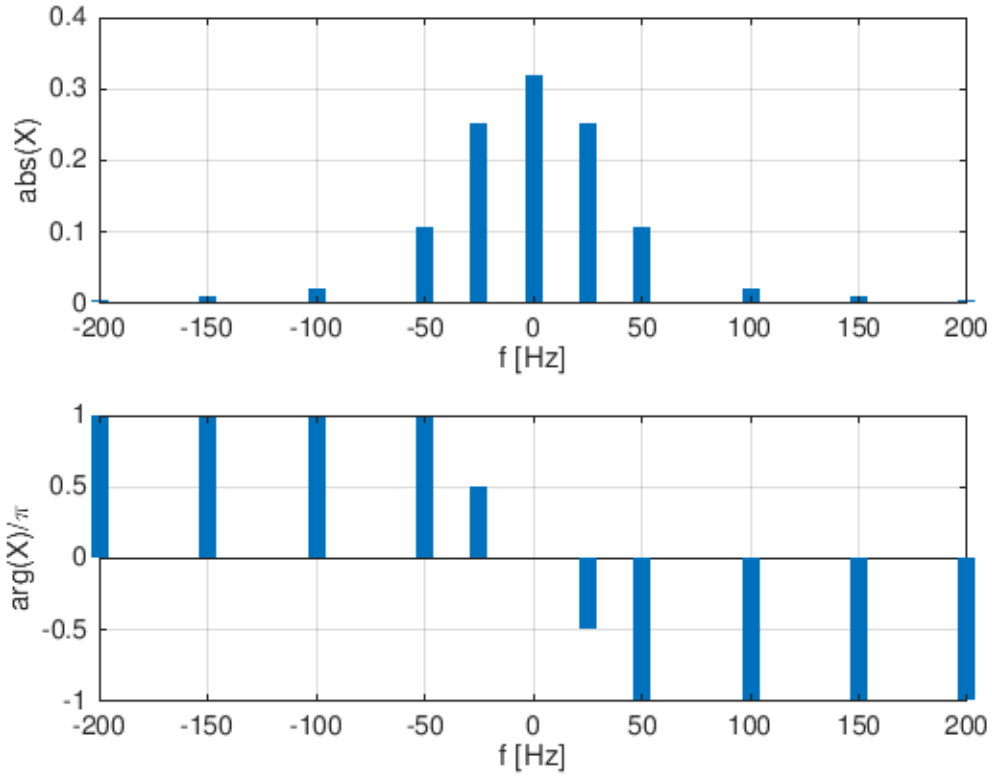
Part 1: generate spectrum of harmonic signal and store it in the structure

spec with fields f for frequencies and X for complex coefficients

```
k=0:1:8;
Xp=1/4*exp(-j*pi/2*k).*(sinc((1-k)/2)+sinc((1+k)/2));
spec.X=[conj(fliplr(Xp(2:end))) Xp];
spec.f = 25*[-fliplr(k(2:end)) k];
```

Part 2: Plot the magnitude and phase spectra in one Figure

```
subplot(211)
p=stem(spec.f,abs(spec.X));
set(p,'Marker','none')
set(p,'LineWidth',6)
ylabel('abs(X)')
xlabel('f [Hz]')
grid
subplot(212)
q=stem(spec.f,angle(spec.X)/pi);
set(q,'Marker','none')
set(q,'LineWidth',6)
ylabel('arg(X)/\pi')
xlabel('f [Hz]')
grid
```



Answers to questions for Problem 1:

a) The fundemental frequency is 25Hz. The fundemental frequency is determined by finding the greatest denominator of all frequencies.

b) We know that the given signal is periodic because all frequencies are related by a rational ratio. This means, the fundemental frequency is a real number.

d) When a function is called without arguments, it ends up calling the HELP and shows the information on the function

c) The code is as follows:

```
%function spplot(spec)
% SPPLOT plots the twosided magnitude and phase spectrum
% usage: spplot(spec)
% input: spec a structure with
% spec.f a vector of nonnegative frequencies only
% spec.X the complex coefficients of the spectrum
% output: a figure with two subplots with the spectrum plots
%    set(p,'Marker','none')
%    set(p,'LineWidth',6)
%    ylabel('abs(X)')
%    xlabel('f [Hz]')
%    grid
%subplot(212)
```

```
%    q=stem(spec.f,angle(spec.X)/pi);
%    set(q,'Marker','none')
%    set(q,'LineWidth',6)
%    ylabel('arg(X)\/pi')
%    xlabel('f [Hz]')
%    grid
%end

% The plot results can be found attached in another pdf document
 called matlab-1-c.pdf
% Additionally, spplot.m is attached for runnable code.
```

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