

EEE391 - Computer Assignment 1

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(a)

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$$\omega_0 = 01 \text{ rad/s}$$

$$A_1 = 1, A_2 = 9, A_3 = 6$$

$$\Phi_1 = 001, \Phi_2 = 019, \Phi_3 = 196$$

$$x(t) = 1\cos(1t + 19\pi/180)$$

$$y(t) = 1\cos(1t + 1\pi/180)$$

$$z(t) = 1\cos(1t + 196\pi/180)$$

(b)

(i) Asks for the inputs

```
%ask for user input
askwo = 'What is the value of wo?: ';
wo = input(askwo);

askA1 = 'What is the value of A1?: ';
a1 = input(askA1);

askA2 = 'What is the value of A2?: ';
a2 = input(askA2);

askA3 = 'What is the value of A3?: ';
a3 = input(askA3);

askfi1 = 'What is the value of o1?: ';
fi1 = input(askfi1);

askfi2 = 'What is the value of o2?: ';
fi2 = input(askfi2);

askfi3 = 'What is the value of o3?: ';
fi3 = input(askfi3);
```

(ii) do the phasor addition, then display A and  $\Phi$

```
% Define three complex numbers using the inputs
ph1 = a1*exp(1i*deg2rad(fi1));
ph2 = a2*exp(1i*deg2rad(fi2));
ph3 = a3*exp(1i*deg2rad(fi3));

%do the phasor addition
ph = ph1 + ph2 + ph3;

% Step-wise vector sum
vecs = cumsum([ph1; ph2; ph3]);
vec2 = cumsum([0, ph]);
%shows 4 values to the right by default
disp(ph);
```

(iii) display the result in the correct form and sign

```
%check the sign of the phase
ispositive = atan(real(ph)) > 0;

sign = '-';
if ispositive
    sign = '+';
end

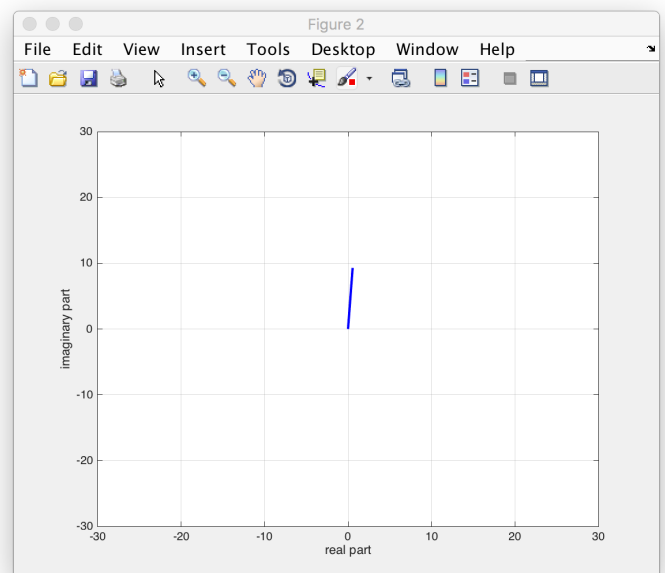
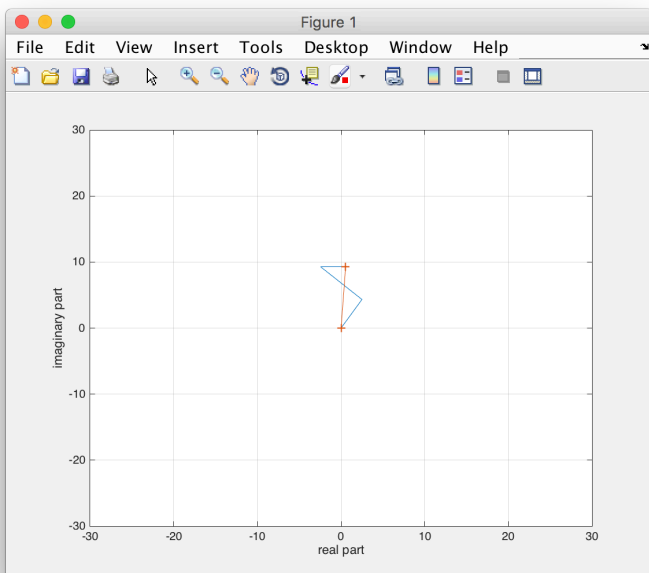
finishedResult = sprintf('x(t) = %.2f*cos(%dt %s %.2fpi)', abs(ph), wo, sign,
    (atan(real(ph))));

disp(finishedResult);
```

(iv and v) plot the phasors of the three sinusoidal signals as well as the resulting phasor.  
resulting phasor is shown in a different colour

```
% Plot 3 signals and the resulting signal
vecs = [0; vecs]; % add origin as starting point for the resulting signal
figure;
plot(real(vecs), imag(vecs), real(vec2), imag(vec2), '-+');
xlim([-30 30]);
ylim([-30 30]);
xlabel('real part');
ylabel('imaginary part');
grid on;

% Plot
figure;
plot(real(vec2), imag(vec2), 'b','LineWidth',2);
xlim([-30 30]);
ylim([-30 30]);
xlabel('real part');
ylabel('imaginary part');
grid on;
```



## Matlab Console Output:

```
What is the value of wo?: 2
What is the value of A1?: 5
What is the value of A2?: 7
What is the value of A3?: 3
What is the value of o1?: 60
What is the value of o2?: -225
What is the value of o3?: 0
    0.5503 + 9.2799i

x(t) = 9.30cos(2t + 0.50pi)
```

MATLAB R2015b

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hw1.mat

hw1\_code.m

hw1\_code.m~

plotter.m

Editor - hw1\_code.m

22 askf13 = 'What is the value of 03?';

23 f13 = input(askf13);

24

25

26 % Define three complex numbers using the inputs

27 ph1 = a1\*exp(1i\*deg2rad(f11));

28 ph2 = a2\*exp(1i\*deg2rad(f12));

29 ph3 = a3\*exp(1i\*deg2rad(f13));

30

31 %do the phasor addition

32 ph = ph1 + ph2 + ph3;

33

34 % Step-wise vector sum

35 vecs = csumsum(ph1; ph2; ph3);

36 vec2 = csumsum([0, ph]);

37 disp(ph);

38

39 %check the sign of the phase

40 ispositive = atan(real(ph)) > 0;

41

42 sign = '-';

43 if ispositive

44 sign = '+';

45

46 end

47 finishedResult = sprintf('x(t) = %.2f\*cos(%d\*%s %.2f\*pi)', abs(ph), wo, sign, (atan(real(ph))));

48

49 disp(finishedResult);

50

51 % Plot 3 signals and the resulting signal

52 vecs = [0; vecs]; % add origin as starting point for the resulting signal

53 figure;

54 plot(real(vecs), imag(vecs), real(vec2), imag(vec2), '-+');

55 xlim([-30 30]);

56 ylim([-30 30]);

57 xlabel('real part');

58 ylabel('imaginary part');

59 grid on;

60

61 % plot

62 figure;

63 plot(real(vec2), imag(vec2), 'b', 'LineWidth', 2);

64 xlim([-30 30]);

65 ylim([-30 30]);

66 xlabel('real part');

67 ylabel('imaginary part');

68 grid on;

69

Command Window

Workspace

Variable Value

a1 5

a2 7

a3 3

askA1 'What is the value...

askA2 'What is the value...

askA3 'What is the value...

askf11 'What is the value...

askf12 'What is the value...

askf13 'What is the value...

askwo 60

f11 -225

f12 0

f13 0

finishedResult x(t) = 9.30cos(2...

ispositive 1

ph 0.5503 + 9.2799i

ph1 2.5000 + 4.3301i

ph2 -4.9497 + 4.9497i

ph3 3

sign '+'

vec2 [0.0000 + 0.0000...

vec3 [0.0000 + 0.0000...

wo 2

Ln 54 Col 23