`Vehicular Electronics HW3

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All code is written in matlab.

**Q1.**

**Source with comment**

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| --- |
| % v\_s = v\_a + v\_b∠120˚ + v\_b∠240˚  % (a)  v\_s = 240 - 120 \* exp(2 \* pi \* j / 3) - 120 \* exp(4 \* pi \* j / 3);    v\_s\_mag = abs(v\_s) % Magnitude  v\_s\_angle = angle(v\_s) % Angle (rad)    % (b)  v\_s = 207.8 + 0 \* exp(2 \* pi \* j / 3) - 207.8 \* exp(4 \* pi \* j / 3);    v\_s\_mag = abs(v\_s) % Magnitude  v\_s\_angle = angle(v\_s) % Angle (rad) |

**Answer (a)**

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| --- |
| v\_s\_mag =  360.0000  v\_s\_angle =  -7.8949e-17 |

**Answer (b)**

|  |
| --- |
| v\_s\_mag =  359.9202  v\_s\_angle =  0.5236 |

**Q2.**

**Source with comment**

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| --- |
| % v\_s = v\_a + v\_b∠120˚ + v\_b∠240˚  v\_a = 240;  v\_b = 50 \* exp(2 \* pi \* j / 3);  v\_c = -240 \* exp(4 \* pi \* j / 3);  v\_s = v\_a + v\_b + v\_c;    v\_s\_mag = abs(v\_s) % Magnitude  v\_s\_angle = angle(v\_s) % Angle (rad)    figure  compass(v\_s, 'k');  hold on  compass(v\_a, 'r');  compass(v\_b, 'g');  compass(v\_c, 'b');  legend('v\_s', 'v\_a', 'v\_b', 'v\_c');  hold off |

**Answer**

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| v\_s\_mag =  418.6884  v\_s\_angle =  0.6433 |



**Q3.**

**Answer**

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| , ,  Variable :  if we change :  It gets minimum at  if we change :    It gets minimum at  if we change :    It gets minimum at |

**Source with comment**

|  |
| --- |
| % A very rough graph of P\_loss in terms of i\_F, T, w    % variables  syms i\_F T w  % constants  syms R\_A R\_F f K    phi = f \* i\_F;  V\_A = R\_A \* T / (K \* phi) + K \* phi \* w  i\_A = V\_A / R\_A;  P\_loss = i\_A ^ 2 \* R\_A + i\_F ^ 2 \* R\_F    % Assuming all constants to 1  P\_loss\_c = subs(P\_loss, {R\_A, R\_F, f, K}, {1, 1, 1, 1});    % P\_loss in terms of i\_F (T = 1, w = 1)  figure  P\_loss\_1 = subs(P\_loss\_c, {T, w}, {1, 1});  ezplot(P\_loss\_1);  title('P\_{loss} in term of i\_F')    % P\_loss in terms of T (i\_F = 1, w = 1)  figure  P\_loss\_2 = subs(P\_loss\_c, {i\_F, w}, {1, 1});  ezplot(P\_loss\_2);  title('P\_{loss} in term of T')    % P\_loss in terms of w (i\_F = 1, T = 1)  figure  P\_loss\_3 = subs(P\_loss\_c, {i\_F, T}, {1, 1});  ezplot(P\_loss\_3);  title('P\_{loss} in term of w') |





