**Assignment 1**

**Review of Matlab Calculations**

**Due date Sept 17**

This assignment is a review of ENEL101.

For this assignment fill out this word template with your answers.

Submit a PDF version of your assignment on D2L.

In all assignment questions, angles are in radians unless explicitly indicated otherwise.

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**Q1.** Give the Matlab expression to calculate  and the resulting value of x

**(Matlab input)**

x = ((0.2^(5.7))\*((csc(0.2))^3)\*(exp(2.7)))+(sinh(0.1))

**(Matlab Response)**

x =

0.2970

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**Q2** Define the variables and  , and then compute 

**(Matlab input)**

x = sqrt(3)

x =

1.7321

>> y = 0.3\*(x^2) + sqrt(x)

y =

2.2161

>> z = sqrt(exp(1)) + x - log(x) - log10(x)

z =

2.5929

>> v = sqrt(tanh(x\*y\*z))

**(Matlab Response)**

v =

1.0000

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**Q3.** Let  and  (that is y is a complex number with ). Determine the vector of .

**(Matlab input)**

>> x = -2; y = 0 + 3i; z = [x^y x\*(y^2) exp(sqrt(x))]

**(Matlab Response)**

z =

-0.0000 + 0.0001i 18.0000 + 0.0000i 0.1559 + 0.9878i

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**Q4.** Determine the magnitude and angle (in degrees) of the array of values z in **Q3**.

**(Matlab input)**

>> mag = abs(z), ang = (180/pi) .\* angle(z)

**(Matlab Response)**

mag =

0.0001 18.0000 1.0000

ang =

119.1432 0 81.0285

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**Q5.** A matrix is given as



Determine the matrix 

**(Matlab input)**

x = [1 2 0; 2 7 1; 0 0 5]

**(Matlab Response)**

z =

8 22 2

22 74 15

0 0 40

……………………………………………………………………………………………………………………………….

**Q6.** Assume that



Determine and

**(Matlab input)**

>> x = [1 2 0; 2 7 1; 0 0 5], y = [1; 2; 3]

z = (y')\*x\*y

w = y\*(y')

**(Matlab Response)**

x =

1 2 0

2 7 1

0 0 5

y =

1

2

3

z =

88

w =

1 2 3

2 4 6

3 6 9

……………………………………………………………………………………………………………………………….

**Q7.** Assume a row vector of samples given as . Also assume a rowvector y calculated with the elements of x given as



where the subscript ‘i’ denotes the element index. Finally we have a matrix . Determine 

**(Matlab input)**

x = linspace(-50, 30, 81), y = 3.\*(x.^2) + 2, Q = [x;y], z = Q\*Q'

**(Matlab Response)**

z =

52380 -4229820

-4229820 639094860

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**Q8.** Three vectors are given as



Use dot() and cross() to compute the vector of 

**(ans)**

**(Matlab input)**

u = [-3 4 -2], v = [2 -5 -4], w = [1 -1 -1]

Q = (dot(u,v))^2 \* (cross(cross(u,v),w))

**(Matlab Response)**

Q =

7452 -6156 13608

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**Q9.**  Use Matlab to determine the approximate value of the sum of the infinite series



your answer should be accurate to about 8 significant figures.

**(Matlab input)**

syms n

symsum((cos(1/n))/(n^3+2), n, 1, inf)

vpa(ans)

**(Matlab Response)**

ans = 0.33902846

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**Q10.** Two matrices are given as

 and 

Determine 

**(Matlab input)**

X = [1 2 3; 0 7 7; 1 2 1], Y = [2 2 3; 7 6 0; 1 2 1]

Q = X\(Y+X\*X)

**(Matlab Response)**

Q =

0.5000 2.2857 5.0000

0.5000 7.8571 6.0000

1.5000 2.0000 2.0000

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**Q11.** Solve the linear set of equations using the \ operator in Matlab



Let , be a column vector of the results.

**(Matlab input)**

>> X = [4 1 1; 2 1 13; 3 0 -1];

>> Y = [3;2;11];

>> Q = X\Y

**(Matlab Response)**

Q =

3.8529

-12.9706

0.5588

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**Q12.** A recursive series is formed as



with . Write a for loop in matlab that determines the value of .

**(Matlab input)**

S = zeros(1,200)

S(3) = 1

for n = 4:200

S(n) = 3\*S(n-1) – 2\*S(n-2) + 1

End

**(Matlab Response)**

S =

1.0e+59 \* Columns 199 through 200

4.0173 8.0347

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**Q13** Plot the sequence of



with 

using semilogy() for n=2 to 100

**(Matlab input)**

S = zeros(1, 100)

S(3) = 1

for n = 4:100

S(n) = 3\*S(n-1) – 2\*S(n-2) + 1

end

semilogy(3:100, S(3:100))

**(Matlab Response)**

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**Q14.** A parametric equation is given by

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for a range of t given as . Produce two plots. In the first plot x(t) and y(t) are superimposed. In the second plot assume x along the abscissa and y along the ordinate. Use subplot() to generate the two plots stacked vertically.

**(Matlab input)**

t = linspace(0,10)

x = (3.\*(t.^1.3))./(1 + t.^3)

y = (3.\*(t.^2))./(1+t.^3)

subplot(2,1,1)

plot(t,x,t,y)

xlabel("t")

ylabel("x,y")

subplot(2,1,2)

plot(x,y)

xlabel("x")

ylabel("y")

**(Matlab Response)**

