

Question 1

$$f(x) = x^2 \cos(x) - \ln(x)$$

iter	x_l	x_r	x_u	$f(x_l)$	$f(x_r)$	$f(x_u)$	ϵ_a
1	1	1.206992	1.9	0.540302	0.330256	-1.80893	
2	1.206992	1.313981	1.9	0.330256	0.165484	-1.80893	0.081424
3	1.313981	1.363098	1.9	0.165484	0.073383	-1.80893	0.036033

Question 2

$$f(x) = e^{0.5x} \cos(x)$$

$$f'(x) = 0.5e^{0.5x} \cos(x) - e^{0.5x} \sin(x)$$

$$x_{i+1} = x_i - \frac{\cos(x)}{0.5 \cos(x) - \sin(x)}$$

iter	x_i	$f(x)/f'(x)$	ϵ_a
0	1.8	0.208931	
1	1.591069	0.020072	0.131315
2	1.570997	0.000201	0.012776

Question 3

$$6.2x - 2y - 1.8z = 15.8$$

$$2x + 5.2y - 2.1z = 3.05$$

$$0.5x - 0.3y - 0.9z = 3.3$$

6.2	-2	-1.8	15.8
2	5.2	-2.1	3.05
0.5	-0.3	-0.9	3.3

ITER	x	y	z
	1	-2	-3
1	1.032258	-1.02202	-2.75252
2	1.419585	-1.07105	-2.52099

Question 4

$$1) \epsilon_a = \frac{0.004}{8.701} = 0.46 \times 10^{-3} < 0.5 \times 10^{-d} \quad d = 3$$

$$2) [A]^{-1} = \frac{1}{|A|} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix} = \frac{1}{5} \begin{bmatrix} 2 & -2.5 \\ -1.6 & 4.5 \end{bmatrix} = \begin{bmatrix} 0.4 & -0.5 \\ -0.32 & 0.9 \end{bmatrix}$$

$$3) \begin{vmatrix} 5-\lambda & 8 \\ 1 & 3-\lambda \end{vmatrix} = 0 \quad (5-\lambda)(3-\lambda) - 8 = 0 \quad \lambda^2 - 8\lambda + 7 = 0 \quad (\lambda-7)(\lambda-1) = 0 \quad \lambda_1 = 7, \lambda_2 = 1$$