DSECL ZC416 - Mathematical Foundations for Data Science

Assignment - 8

(Q1). Implementing Gaussian Elimination Method.

(i)

Ans:

Operation	Approx. time taken for one operation.
Addition	$1.2328 \times e^{-7}$ seconds
Multiplication	0.00029688 seconds
Division	$3.4645 \times e^{-7}$

(ii) Ans: Code shared seperately

(iii) Ans:

Test Case	With Pivoting			Without Pivoting		
	Addition	Multiplication	Division	Addition	Multiplication	Division
100	3,43,300	3,43,300	5,050	3,43,300	3,43,300	5,050
200	27,06,600	27,06,600	20,100	27,06,600	27,06,600	20,100
300	90,89,900	90,89,900	45,150	90,89,900	90,89,900	45,150
400	2,14,93,200	2,14,93,200	80,200	2,14,93,200	2,14,93,200	80,200
500	4,19,16,500	4,19,16,500	1,25,250	04,19,16,500	4,19,16,500	1,25,250
600	7,23,59,800	7,23,59,800	1,80,300	7,23,59,800	7,23,59,800	1,80,300
700	11,48,23,100	11,48,23,100	2,45,350	11,48,23,100	11,48,23,100	2,45,350
800	17,13,06,400	17,13,06,400	3,20,400	17,13,06,400	17,13,06,400	3,20,400
900	24,38,09,700	24,38,09,700	4,05,450	24,38,09,700	24,38,09,700	4,05,450
1000	33,43,33,000	33,43,33,000	5,00,500	33,43,33,000	33,43,33,000	5,00,500

(iv) Result table and graph

(a) Result table.

Sl. No.	n	Actual time with pivoting (secs)	Actual time without pivoting (secs)	Theoretical time total = (add + mul + div)
01	100	0.43718	0.44702	6,91,650
02	200	3.3581	3.3569	54,33,300
03	300	11.1641	11.2933	1,82,24,950
04	400	26.2711	27.5518	4,30,66,600
05	500	49.0445	52.4571	8,39,58,250
06	600	85.2993	91.8143	14,48,99,900
07	700	141.5861	154.7661	22,98,91,550
08	800	212.0081	238.5417	34,29,33,200
09	900	301.3688	327.5136	48,80,24,850
10	1,000	415.5138	440.9039	66,91,66,500

(b) Shared in PDF form from notebook.