

Programming and Numerical Analysis (A)

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Problem 11

Obtain the inverse matrix of

$$A = \begin{pmatrix} 1 & 3 & 3 & 2 \\ 2 & 1 & -8 & -1 \\ 1 & 1 & 6 & 4 \\ 1 & 6 & 5 & 2 \end{pmatrix}$$

by use of Gauss-Jordan Elimination.

```
> c gauss_driver.c gaussj.c nrutil.c; ./run
Input the dimension of the largest square matrix to be used
4
Input the maximum number of r.h.s. vectors
1

Inverse of matrix a :
-153.000015   20.000004   49.000008   65.000015
 31.000004   -4.000001  -10.000002  -13.000004
-47.000008    6.000001   15.000003   20.000006
101.000015  -13.000003  -32.000008  -43.000011

a times a-inverse:
 1.000000   -0.000002   -0.000008   -0.000008
 0.000015    0.999999    0.000000   -0.000004
 0.000000    0.000000    1.000000    0.000000
 0.000015    0.000000    0.000000    1.000000

Check the following for equality:
                        original   matrix*sol'n
vector  1:
           1.000000    1.000002
           1.000000    1.000002
           1.000000    1.000004
           1.000000    1.000000
```

Problem 12

Interpolate the next data by the Lagrange formula

x	-1	-1/2	0	1/2	1
f(x)	0	-1	0	1	0

and evaluate the values of $f(-2)$ and $f(2)$.

```
f(-2.000000)= 16.000000
f(2.000000)= -16.000000
```

Using the given source code, the answers are as shown above.