**Numerical Analysis**

**HW #2**

소프트웨어학부

2018044720

석예림

Text, letter

Description automatically generated

program problem1

implicit none

call newton()

end program problem1

real \* 8 function f(x,y,z)

real \* 8 :: x, y, z

f = x \* y \* z - 1

end function

real \* 8 function g(x,y,z)

real \* 8 :: x, y, z

g = x\*\*2 + y\*\*2 + z\*\*2 - 4

end function

real \* 8 function h(x,y,z)

real \* 8 :: x, y, z

h = x\*\*2 + 2\*y\*\*2 - 3

end function

subroutine newton()

implicit none

real \* 8 :: x, y, z, tol, eN, pxN

real \* 8, external :: f, g, h

double precision, dimension(3, 1):: px,fx,before,error

double precision, dimension(3, 3):: jacobi

integer :: info, job

integer, dimension(3) :: ipiv

double precision, dimension(3, 1) :: b

x = 1

y = 1.2

z = 1.4

b = reshape((/x,y,z/), (/3,1/))

px = reshape((/x,y,z/), (/3,1/))

tol = 1.0e-08

10 fx = reshape((/f(x,y,z), g(x,y,z), h(x,y,z)/), (/3,1/))

jacobi = reshape((/y\*z, 2\*x, 2\*x, x\*z, 2\*y, 4\*y, x\*y, 2\*z, real(0,8)/),(/3,3/))

job = 0

call dgefa(jacobi,3,3,ipiv,info)

call dgesl(jacobi,3,3,ipiv,fx,job)

before = px

px = before - fx ! X(k+1)

error = px-before

eN = abs(error(1,1))+abs(error(2,1))+abs(error(3,1))

pxN = abs(px(1,1))+abs(px(2,1))+abs(px(3,1))

eN = eN/pxN

x = px(1,1)

y = px(2,1)

z = px(3,1)

if(eN > tol) then

goto 10

end if

print \*, "x =", x, "y =", y, "z =", z

print \*, "f =",f(x,y,z)

print \*, "g =",g(x,y,z)

print \*, "h =",h(x,y,z)

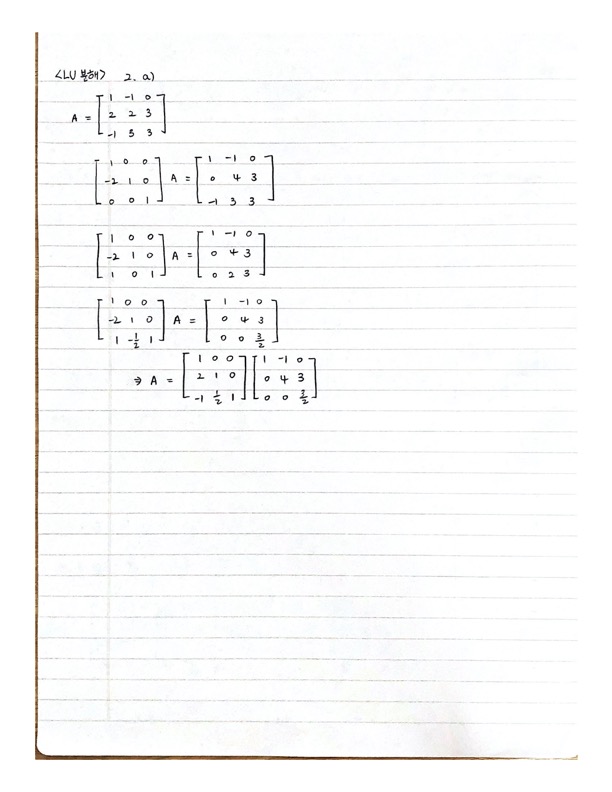
end subroutine

result)

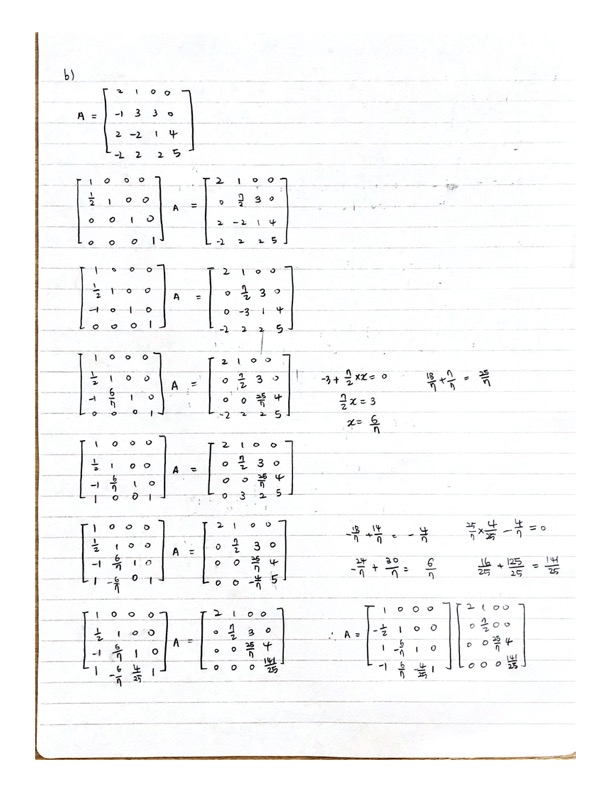
Text

Description automatically generated

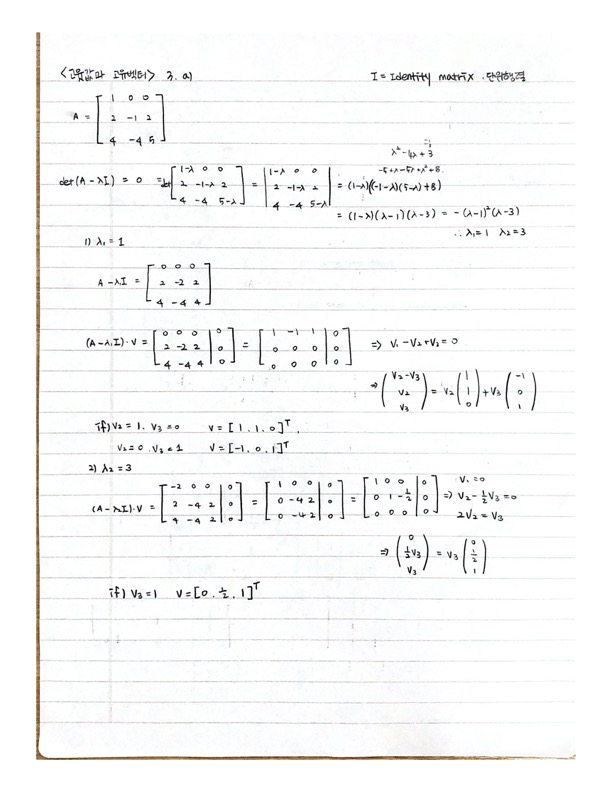
A picture containing text

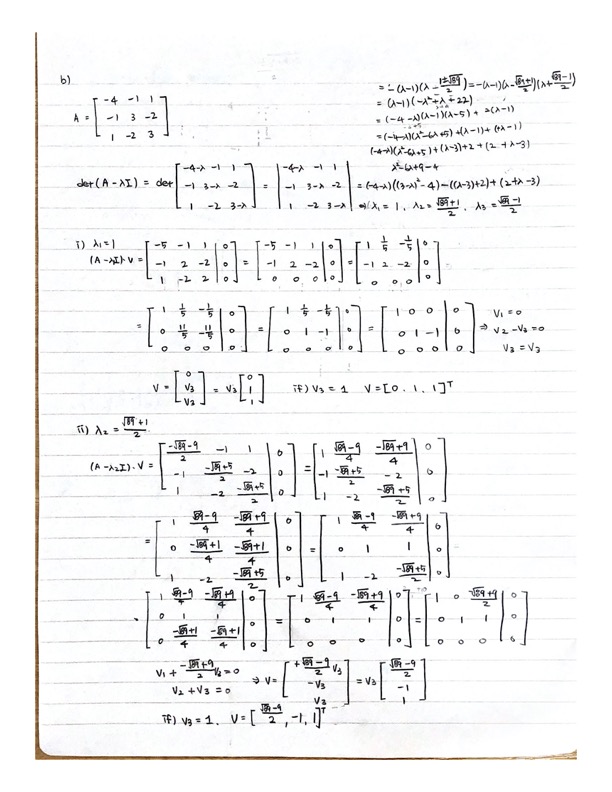
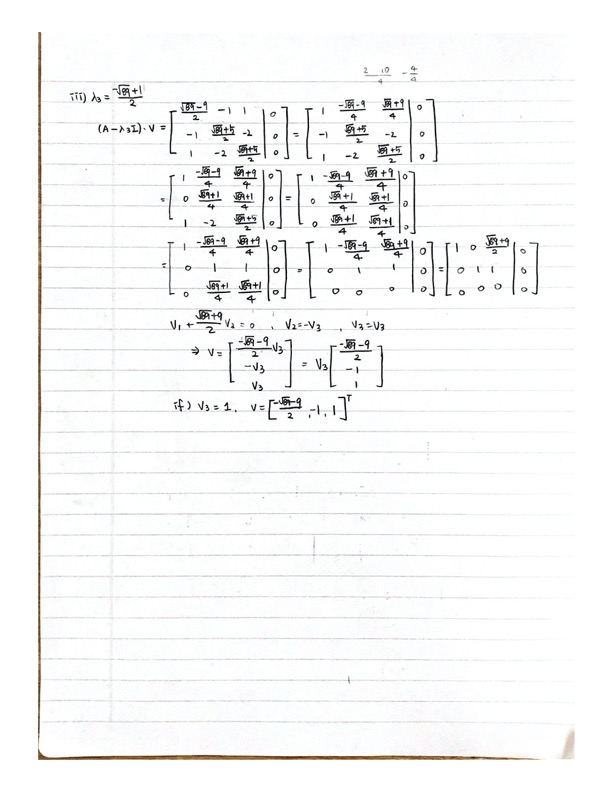
Description automatically generated

A picture containing text

Description automatically generated

A picture containing text

Description automatically generated A picture containing text, clock

Description automatically generated 

Diagram

Description automatically generated