AERE 361: Lab 11

Sean Hellar

Due 28 APR 2022

1 Exercise 1

Algorithm 1 Algorithm for Naive-Gauss time complexity

```
                                                    ▷ Required variables:
number of equations (n)
matrix1: matrix of coeffcients
matrix2: matrix of answers
                                                    ▷ Forward elimination
for k=1 to n-1 do
    for i=k+1 to n do
        normfactor = a(i,k) / a(k,k)
        for j=k+1 to n do
            matrix1(i,j) = matrix1(i,j) - normfactor * matrix1(k,j)
        end for
        matrix2(i) = matrix2(i) - normfactor * matrix2(k)
    end for
end for
                                                    ▷ Backward elimination
x(n) = matrix2(n) / matrix1(n,n)
for i=n-1 to -1 do
    initialize total at 0
    for j=i+1 to n do
        total = total + matrix1(i,j) * x(j)
    end for
    x(i) = matrix2(i) - total / matrix2(i,j)
end for
```

Complexity: The time complexity will be $O(2n^2)$. For each equation you add there is an increase in the power.

2 Sources

https://my.mech.utah.edu/~pardyjak/me2040/Lect8_NaiveGaussElim.pdf