Andrew Goldberg

Week 4 – Math Assignment

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**1. Using matrix operations, describe the solutions for the following family of equations:**

It’s a singular, linearly dependent matrix, so no solutions in R3:

The first equation minus the second equation equals the third equation.

And the determinant = 0:

7 - 2 + -3

=1(0 + 3) – 2(0-3) -3(2+1)

=3+6-9 = 0

However the family of equations can be linearly independent in R2, with rank 2, effectively setting z = 0 and ignoring the third, duplicate, equation:

=

-3 y = 3

y = -1

1x+2(-1) = 5

x = 7

**2. Provide a solution for #1, using R functions of your choice.**

>a <- rbind(c(1,2,-3),

c(2,1,-3),

c(-1,1,0))

>b <- c(5,13,-8)

>solve(a,b)

Error in solve.default(a, b) :

Lapack routine dgesv: system is exactly singular: U[3,3] = 0

In R2:

a <- rbind(c(1,2),

c(2,1))

b <- c(5,13)

solve(a,b)

3. Solve for AB by hand:

AB = = =

4. Solve AB from #3 using R functions of your choice.

>c <- rbind(c(4, -3),

c(-3, 5),

c(0, 1))

>d <- rbind(c(1, 4),

c(3, -2))

>c %\*% d

[,1] [,2]

[1,] -5 22

[2,] 12 -22

[3,] 3 -2