DAT 605 - Week 4 Discussion Reply to CRosemond

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## R Markdown

library(matlib)  
library(MASS)

## C10† of Beezer: A First Course in Linear Algebra in Page 512

Vector Linear Represenation using R of prob C10

A <- matrix(c(2,1,3,-2,3,5,2,1,2),byrow=T,nrow=3,ncol=3)  
b <- matrix(c(11,5,8),nrow=3,ncol=1)  
p <- nrow(A)  
(Umat <- cbind(A,b))

## [,1] [,2] [,3] [,4]  
## [1,] 2 1 3 11  
## [2,] -2 3 5 5  
## [3,] 2 1 2 8

#Pivot: The ﬁrst non-zero element in the row being evaluated  
Umat[1,] <- Umat[1,]/Umat[1,1]  
  
i <- 2  
while (i < p+1) {  
 j <- i  
 while (j < p+1) {  
 Umat[j, ] <- Umat[j, ] - Umat[i-1, ] \* Umat[j, i-1]  
 j <- j+1  
 }  
   
   
# Check to see if 2nd and 3rd pivot of Augmented Matrix A is 1 or not  
# If not, make it to 1 by dividing by its own coeficient  
 while (Umat[i,i] == 0) {  
 Umat <- rbind(Umat[-i,],Umat[i,])#this checks if its indeed already zero, if so, row bind it together and move on  
 }  
 Umat[i,] <- Umat[i,]/Umat[i,i]# this makes it 1 by dividing its own coeficient  
 i <- i+1  
}  
  
#Making off-pivot coeficient to zero  
for (i in p:2){  
 for (j in i:2-1) {  
 Umat[j, ] <- Umat[j, ] - Umat[i, ] \* Umat[j, i]  
 }  
}  
  
Umat

## [,1] [,2] [,3] [,4]  
## [1,] 1 0 0 2  
## [2,] 0 1 0 -2  
## [3,] 0 0 1 3

## Observation:

* Solving the Augmented matrix results in the same vector that C Rosemond has found by hand.