QR Factorization

CaseyJayne

7/11/2021

QR Factorization using Gram Schmidt Algorithm

First I wrote the GS and a normalization algorithm. The R matrix will be made “by hand”

```
gs <- function(vectors){
    #'@param vectors a list of vectors
    #'@return a list of orthogonal vectors
    #'@author Casey Jayne

    vecs = list()
    for(i in 1:length(vectors)){
        amount = 0
        for(vals in 1:(i-1)){
            if(length(vecs)>=1){
                t = (t(vecs[[vals]]) %*% vectors[[i]])/crossprod(vecs[[vals]])
                t = t[[1]]*vecs[[vals]]
                amount = amount+t
            }
        }
        vecs[[i]] = vectors[[i]] - amount
    }

    return(vecs)
}

vec_normalize <- function(vectors){
    #'@param vectors a list of vectors
    #'@return a list of normalized vectors by 2norm
    #'@author Casey Jayne
    for(item in 1:length(vectors)){
        vectors[[item]] = vectors[[item]]/sqrt(sum(vectors[[item]]^2)) # standard 2 n
orm
    }

    return(vectors)
}
```

Create the list of vectors given

```
m = list(matrix(c(1,0,1)), matrix(c(0,1,1)), matrix(c(1,4,6)))
```