

Homework for 6.4

These were both done in Matlab- This was Gram-Schmidt and QR.

24. For the first matrix, use the Gram-Schmidt method. For example,

```
A=[10 13 7 11;
    2 1 5 3;
    6 3 13 3;
    16 16 2 5;
    2 1 5 7 ];

v1=A(:,1)./norm(A(:,1));
v2=A(:,2)-(A(:,2)*v1) * v1;
v2=v2./norm(v2);
v3=A(:,3)-(A(:,3)*v2) * v2 - (A(:,3)*v1) * v1;
v3=v3./norm(v3);
v4=A(:,4)-(A(:,4)*v3) * v3- (A(:,4)*v2) * v2- (A(:,4)*v1) * v1;
v4=v4./norm(v4);
U=[v1 v2 v3 v4]
```

25. For the QR factorization of A , we can use the matrix we just formed for Q , then solve for R : $R = Q^T A$. In Matlab, using the notation from the first problem,

```
Q=U;
R=Q'*A;
```

And we could verify by taking $Q \cdot R$ to see if the result is indeed the matrix A .