Notes from Office Hours

# 11/13/2023

## Background Question 1

* Yes, we are understanding it correctly
* Q is I, A is R, use those to evaluate Y^T, “do it backwards”
  + Build Q and R, build D from R
    - How to invert R?
* Examples are created from referenced papers in project description, so look at those to help answer the questions
  + Reference paper 3 is “really good”, 2 is “meh”, 1 is “really intense”

## Question 2.1

* Need to show that vectors in the range of the original and the approximation are close, i.e. their difference is within epsilon (using norms ?)
* Inequality needs condition that matrix is not full rank
  + If matrix isn’t a low rank, factorization won’t do anything
* Value of epsilon will be very small!

## Extra Credit

* We can still get points just for marking up the project description pdf if we don’t have time to do a full rewrite

## Other Textbooks

* Linear algebra textbook by “Randy LeVeque” (?)

## Independent Extension

* Just replace SVD with RRQR low rank approximation will be enough for the project
  + Should we force a rank value? Force an epsilon value? Create some other method to determine which rank or epsilon to use?
    - Distinct gap in singular values seems like a good place to start
  + Data that papers use is usually available online, so we can use that
  + Adrianna: implement a RRQR version of a paper that uses SVD instead using two different techniques and test them against each other
    - Use a standard package if possible
    - Create own file if we end up signal processing an audio file since most music is already very cleaned up
* Maybe consider a longer paper?
  + Find the real, extended, “bloated” paper of the one we were looking at by looking up the authors

# 11/27/2023

## How to find R inverse?

* R is upper triangular, so its inverse can be calculated by applying it to I, inverse should be negative of the upper triangular entries?

## What do the inequalities mean?

* One inequality gives a lower bound on the error (not very useful)
* Both inequalities give error bounds