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Math 2605 Project Written Component

Part 1 e)

Part 1 f)

i) By using LU or QR-factorizations, we can solve the problem with forward and backward substitution. This process involves a concrete number of simple algebraic operations directly proportional to the size of the give matrix. On the other hand, calculating the inverse matrix would not be easily be formulated into a procedure that can given to a computer. If one did create such a procedure, it would require many more multiplication and division operations, which would increase error due to the finite precision of floating point storage.

ii) Using LU or QR-factorizations does not incur significant error, as seen in the graphs above. As n increases, there is little change in the error of (LU – H)/(QR – H) and (Hx – b), meaning that these factorizations can be used effectively when scaled to higher n values. The increase in error, which was recorded to be no larger than 1E-12 for (Hx - b), is well worth the decrease in runtime.