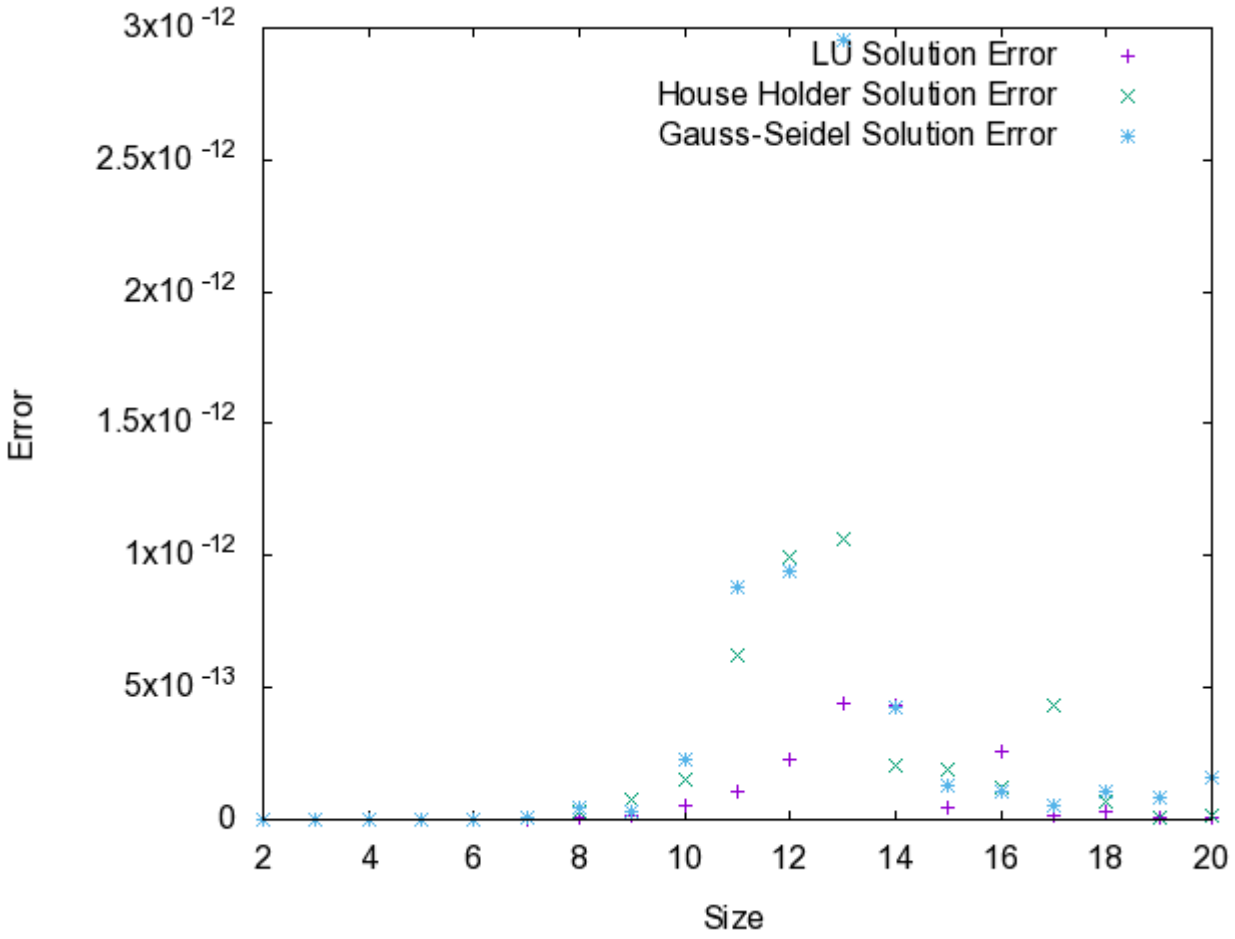
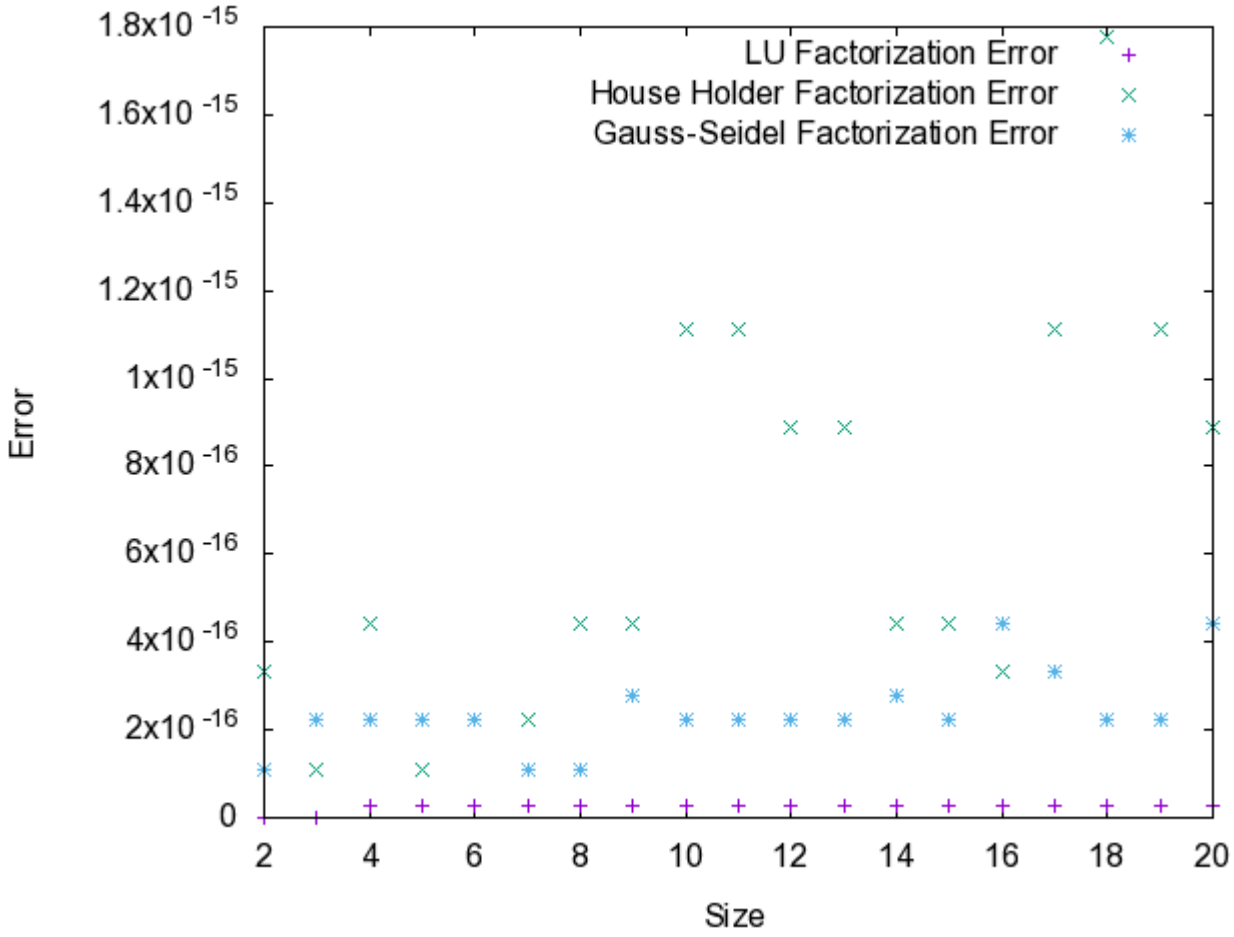
Hilbert Matrix





Calculating an inverse of a matrix is hard to implement, as it requires determinant (among other things), which is slow and clunky to implement. It is justified to use the LU and QR-factorizations as they are fast, and as is evident in the graphs, produce extremely small errors. As well, the errors they produce are consistent and predictable. This provides the benefit of predictability: if you know what error is acceptable, it is easy to predict whether LU or QR factorizations are going to be within those error bounds. For example, the LU factorization produced almost identical error no matter how many iterations were used. Gauss-Seidel was almost as consistent,. The House Holder method is a bit less accurate, but still has very small error. LU factorization is the best in terms of error, but not the best in terms of execution speed.