CSE/MATH 6643, Spring 2020

HW 1

Jan. 16 Due on Jan. 30, in class

No homework will be accepted after the due date. For obtaining full credit, it is important that you show ALL your work. It is not necessary, but I prefer that you type up your solutions so that it is easy to read.

The problems are based on the questions in the textbook by Golub and Van Loan 4th edition. Each problem is worth 10 points.

1. P1.1.3, page 13. Present the highest order term for the flop count of your algorithm with its coefficient (e.g. $\frac{2}{3}n^2$). You need to present the fastest algorithm to get full credit.
2. P1.1.5, page 13.
3. P1.2.2, page 21. For the flop count, present the highest order term with its coefficient. You need to present the fastest algorithm to get full credit.
4. P1.3.9, page 32. For this problem, read Section 1.3.6 which was not covered in a lecture.
5. P2.1.4, page 68
6. P2.1.6, page 68
7. P2.1.8, page 68
8. P2.2.9, page 70
9. P3.1.2, page 110
10. P3.1.7, page 110. Assume that both L and K are nonsingular.
11. P3.2.5, page 121
12. P3.2.6, page 121
13. P3.4.1, page 136
14. Present an algorithm to estimate the machine precision of a floating point system assuming you do not know the base b nor the number of mantissa digits t. Justify your answer. Then write a computer program based on your algorithm where the output is the estimated machine precision for double precision computation on your system. Present the code and the output.

    I encourage you to do all programming in Matlab. If you are not familiar with Matlab, then you may use other language for HW1. But it will make your work easier to eventually use Matlab for studying numerical algorithms.