Worksheet #12 (2017/11/20)

Name: ID:

CS3330 Scientific Computing, Instructor: Cheng-Hsin Hsu

Note: we will collect this worksheet at the end of the lecture.

- We plan to cover Sections 3.5.1–3.5.3 today.

- We use Chapter 03 slides 29–47.

- This is corresponding to the textbook pages 121–134.

1) Consider an oversimplified householder transform with $a = [0, 1]^T$. Find the v so that $v = a - \alpha e_1$. What are the two α values? What are the corresponding v and Ha values?

2) Generalize householder transform so that we can annihilate all but the first k components.

3) Givens QR factorization is more complex than Householder QR factorization. When do you think we should consider Givens?

4) In Gram-Schmidt orthogonalization (both versions), what happen if r_{kk} becomes zero? Can we do anything about it? What if r_{kk} is very close to zero, what problem will we run into?