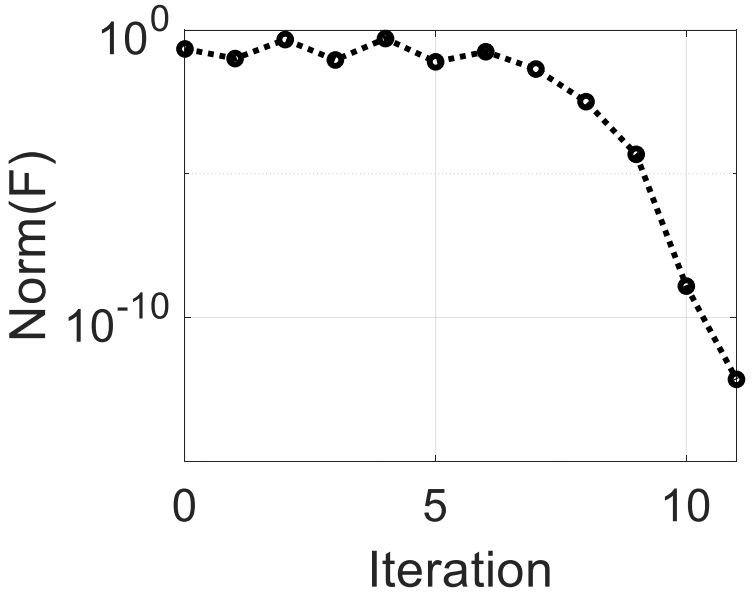
ASEN 6060
ADVANCED ASTRODYNAMICS
Week 7 Discussion, Part 1

Objectives:

- Gain intuition that will be useful for creating, debugging, and assessing implementation of numerical corrections algorithms

Example 1: Computing an L_2 Lyapunov Orbit

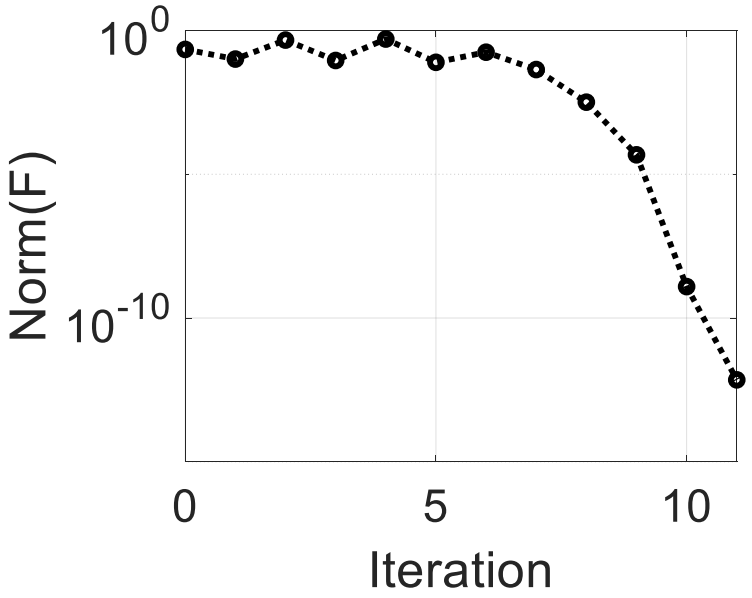
Your colleague has created a script to numerically compute an L_2 Lyapunov orbit via a single-shooting corrections scheme



Question 1: Do you think that their corrections scheme could be implemented correctly? What information would you ask for to assess this further or help them identify any issues, if applicable, and why?

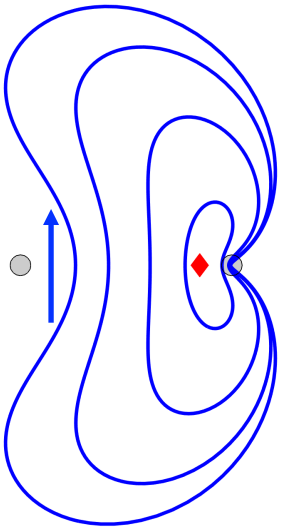
Question 1

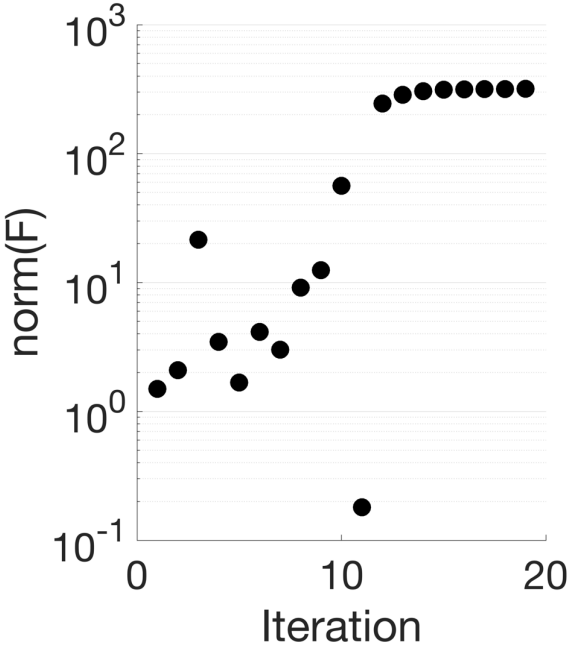
Group Brainstorming:



Example 2: Computing an L_1 Lyapunov Orbit

Your colleague has created a script to numerically compute an L_1 Lyapunov orbit via single-shooting

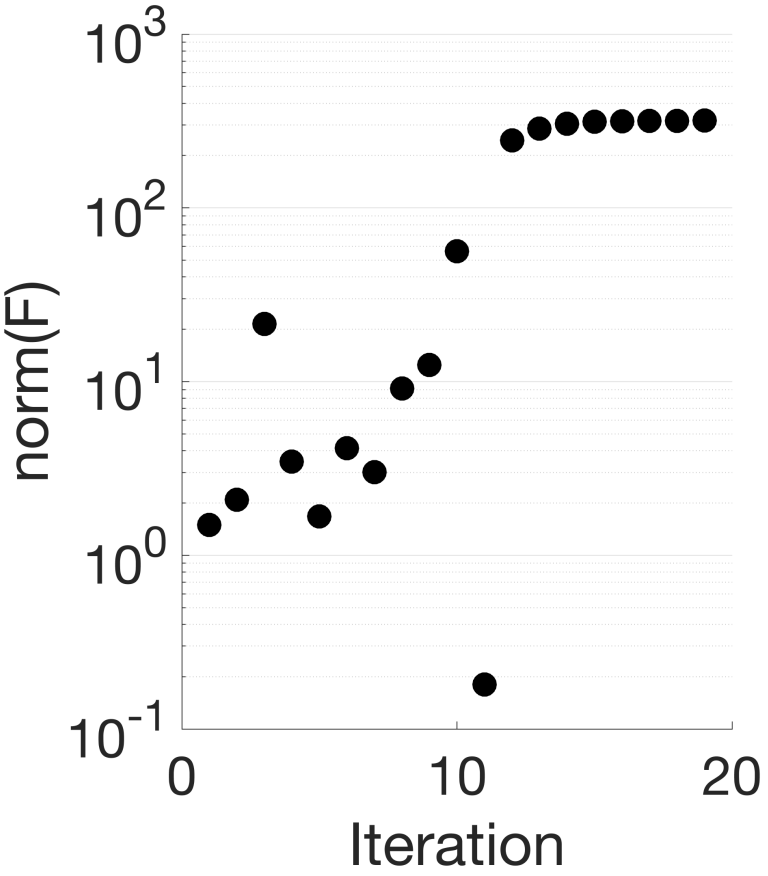




Question 2: What information would you ask for to determine whether they have implemented their corrections algorithm correctly or help them identify any issues, if applicable, and why?

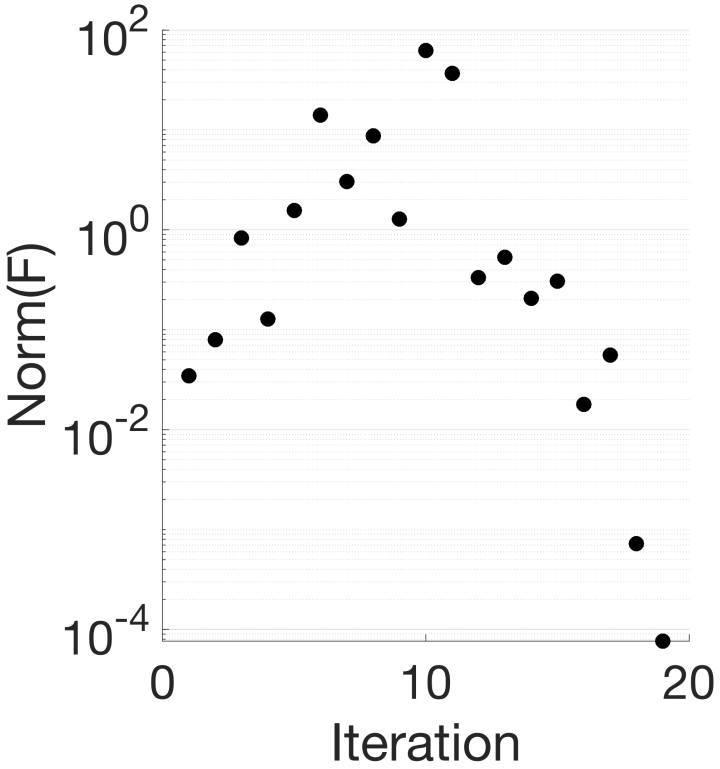
Question 2

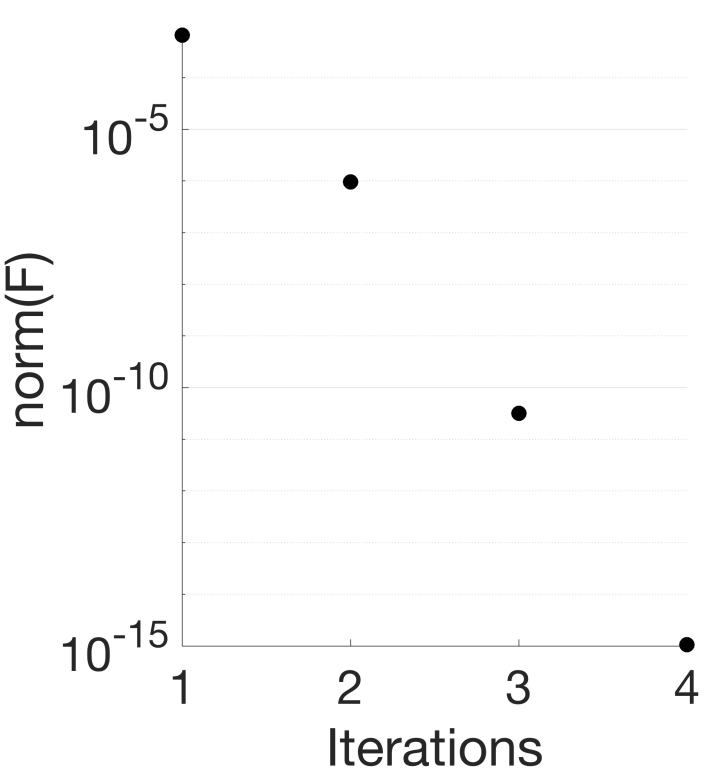
Group Brainstorming:



Example 3: Computing an L_1 Lyapunov Orbit

Two colleagues have independently implemented single shooting schemes to compute an L_1 Lyapunov orbit. They used the same trajectory to generate an initial guess but get two different results:

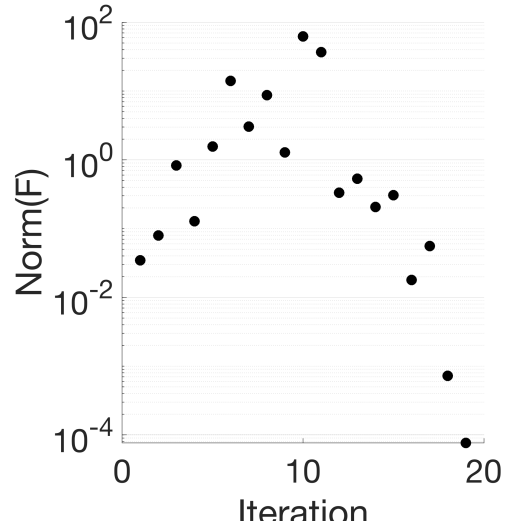


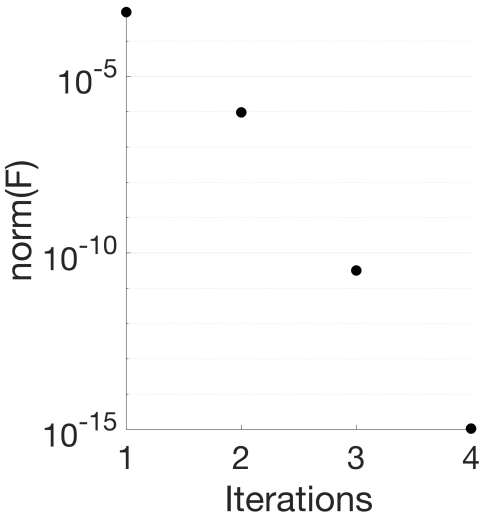


Question 3: Create a list of possible reasons that they are producing different results

Question 3

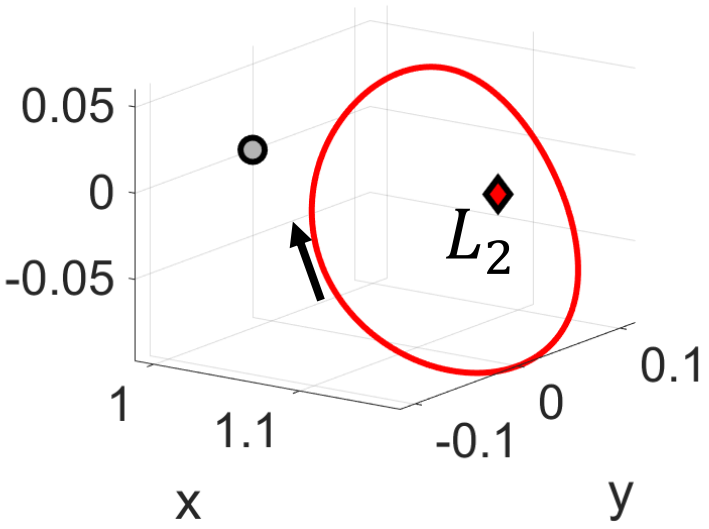
Group Brainstorming:

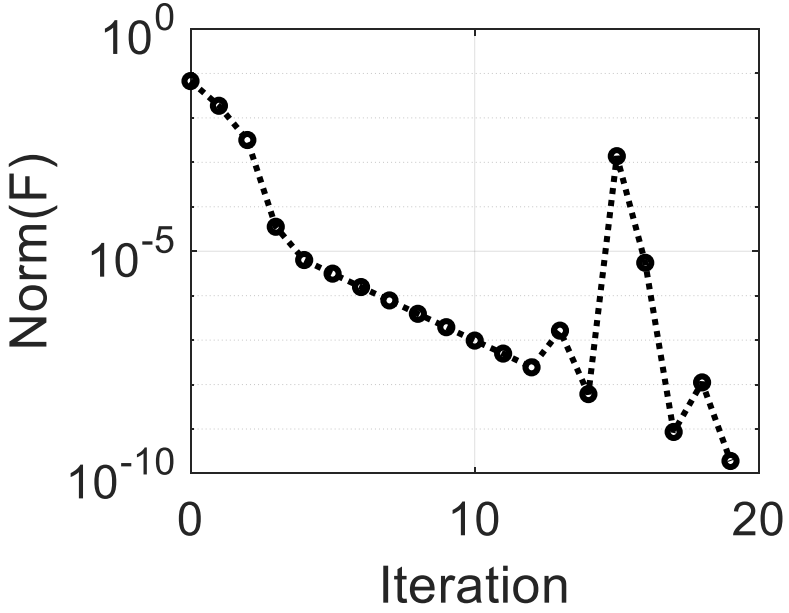




Example 4: Computing an L_2 Halo Orbit

Your colleague has created a script to numerically compute an L_2 halo orbit via single-shooting

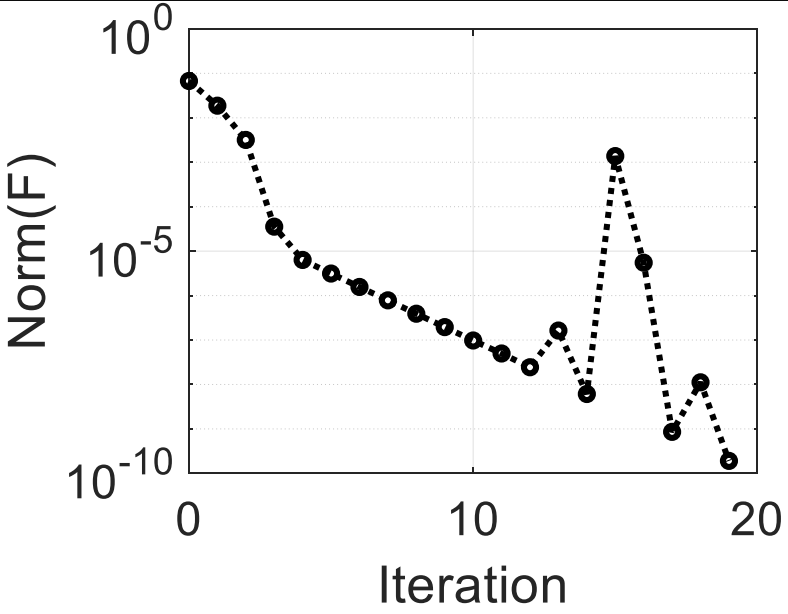




Question 4: What information would you ask for to determine whether they have implemented their corrections algorithm correctly or help them identify any issues, if applicable, and why?

Question 4

Group Brainstorming:



Question 5

Two of your colleagues have independently implemented single shooting schemes to compute a periodic orbit from the same initial guess, using the same definition of the free variable vector. After corrections, their final free variable vectors are slightly different. Let's assume they didn't make any coding errors!

Question 5: List as many reasons that you can think of explaining why there might be slight differences in their results.

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Group Brainstorming: