

MULTIVARIABLE CALCULUS

MATH S-21A

Data project 1: Detective work with space data



1.1. In this first data project, we want to get to know each other and learn a bit about Harvard. This data project deals with spacial data in the image footage (<https://www.youtube.com/watch?v=b5kkB7urSko>).

There are 25 small problems. Each can be answered in a single sentence. Sometimes, even a single word is enough. Split up the work up in your project group, then come together as a team and present the answers with 5 slides, each slide covering one page. The submit the PDF of the slides. Keep things tight and concise. For example, if the question would have been to find clues for the time of the year when the footage was taken, one could state simply "Trees and vegetation. Boats in the water, clothing of people, sun position".

Problem 1:

- a) What general clues are there to determine the wind direction during the time the video was taken?
- b) What general clues are there to determine at which time of the day the pictures was taken?
- c) Try to figure out the time when looking at 6:58.
- d) There are other clue at clocks. Are they consistent?
- e) Do you have an explanation for any discrepancies?

Problem 2: a) The movie has been time modified at time 7:36. We tell how much?
b) At what position and height was the camera at 3:00?
c) Can you use landmarks to determine the position and height of the camera at 5:01?
d) Can you figure out the name and height of the tall white building visible at 4:46?
e) Please reconstruct the picture at 5:01 in the application google earth and make a screen shot.

Problem 3: a) What is the name of the river house with the green dome at 3:50?
b) What is the name of the river house with the red dome at 1:46?
c) What is the name of the river house at 2:00.
d) What is the name of the river house with the blue dome at 4:10?
e) What is the name of the place square shape grass surrounded by a student dorms at 5:43?

Problem 4: a) The Boston skyline shows three large buildings at 2:00. What are the names of these buildings?
b) What is the large building near the river at 1:20. It is also visible at 2:10.
c) Why are there no cars on Memorial drive 1:55?
d) What is inside the gray half spheres on 8:25?
e) On 2:11, we see two bridges. Connect their centers and intersect with the horizon. Which town is this? The name starts with W.

Problem 5: a) At 5:45, there is some lake visible near the horizon. It appears in the picture as a triangular shape. What is the name of these lake. The lake is also visible at 5:36 but it is not the closer Fresh pond to the left.
b) At 4:52, you see at the horizon some chimneys, a bridge and an obelisk type shape which is not a chimney. Identify these points.
c) Oliver lives in the vicinity of the water tower visible at 5:43 in the middle of the picture at the horizon. What is the name of the town?
d) Around 6:05, one can see something from the Boston airport. Identify it and name it.
e) From 1:00 to 1:05, the camera flies towards large new building complex on the other side of the river. Identify it.