Analysis of the Depths of the Charles River

Team Members: Emily Scherer, Elissa Ito,Viviana Rivera

Project Description:

Emily and Elissa are both on the Varsity Sailing Team, Viviana took PE sailing and we wanted to do some sailing-related data analysis because we will have intuition for the results that we calculate at the end and we are interested in the topic! In particular, we are interested in the Charles River because that is where we practice as a team.

We plan to first try asking MIT (primarily MIT Sea Grant) Ocean Engineering Professors if they have depth data for the Charles River, because no numerical data appears to be accessible through the MIT library online database. If no depth data for the Charles River is available from the Ocean Engineering department, we will use the color-coded depth chart available in an article in the Boston Globe published by MIT. We will learn how to import an image and store the (x,y) coordinates paired with a depth defined by the pixel value at that point. This will create a dataset of 3D coordinates that we can use to plot the shape of the Charles. We will then implement **interpolation** methods to obtain finer depth data, which we will then plot onto a 3d graph. Our next goal would be to perform **Integration** to obtain the overall volume of the Charles (in doing so, we may cut off the Charles River to only count between Longfellow and Harvard Bridge). Finally, if we deem reasonable and achievable, we ideally want to create a function that would model a real-life phenomenon. This may be in the form of a function giving the probability of getting mud on your sail when you flip depending on the boat and location of practice. We could also create a function that shows where an object ends up on the bottom of the river based on how fast you are sailing and the coordinates of where you drop the item.

Goal:

To practice 2.086 topics, specifically interpolation and integration, and apply those concepts to a situation that we interact with on a daily basis.

Roles in Implementation:

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| **Team member** | **Roles** |
| Elissa Ito | Acquiring depth data for Charles River (communication with MIT Sea Grant)  Creating a 3D data set of depth using pixel values  Writing midway and final report |
| Emily Scherer | Creating a function that models the probability of getting mud on your sail  Documenting progress for a more detailed report  Writing midway and final report |
| Viviana Rivera | Refining data using interpolation  Performing integration to obtain volume of Charles River  Writing midway and final report |

References:

<https://www.bostonglobe.com/business/2016/12/16/charting-project-reveals-charles-river-depths/FMTKuYABfzHSLxggV0sXkK/story.html>

