MAE 259B: Mechanics of slender structures and soft robots

Homework 1, Spring 2022

Due: 04/14/2022 03:50 PM

Chapter 4 of course notes includes three deliverables:

1. Simulation of the motion of a sphere falling inside viscous fluid (see Section 4.2)
2. Simulation of the motion of N-connected spheres falling inside viscous fluid (see Section 4.3)
3. Simulation of the deformation of elastic beams and comparison with Euler-Bernoulli beam theory (see Section 4.4)

Your submission on BruinLearn should only contain the URL to your GitHub repository. Your GitHub* repository should include the following items:

1. A report in .pdf format (file name should be Homework1.pdf) addressing the questions asked in the deliverables. See the syllabus for formatting requirements.

2. Source code. The submission should have three files named *exactly* as Problem1.[ext], Problem2.[ext], and Problem3.[ext] that implements the three problems; replace [ext] with the appropriate extension based on the programming language** of your choice. You may use as many helper functions/files as needed; however, execution of ProblemX.[ext] should run the simulation asked in problem number X. You should also include a README file containing instructions on how to run your code.

* You should create a GitHub repository for this class and share it with the instructor (khalidjm@seas.ucla.edu). All the homeworks, reports, presentations, and proposal should be uploaded to this repository.

** In the two homeworks for this class, we are essentially rapid-prototyping a software that would be useful for the final project. In this prototyping phase, you can use MATLAB, GNU Octave, Python, etc. However, it is highly recommended that you use C/C++, FORTRAN, Java, etc. for the final project to develop computationally efficient codes.