Regis University – Physics 305A – Fall 2017
Lab 12: Video Analysis

Tutorial: Shooting a basketball

First, let's work through a tutorial that comes with the Logger Pro program. Start the application and open the file "12 Video Analysis.cmbl" in the Tutorials folder. Using the sample video there, follow the instructions to set the scale and to track the motion of the basketball from the time it leaves the player's hand to the time it hits the floor. Please analyze this data in two ways:

- Start with graphs of x vs. t and y versus t. Fit each of them to an appropriate functional form (linear or parabolic). From the fit parameters, calculate the initial x and y velocities and the y acceleration.
- Next, switch to graphs of v_x vs. t and v_y versus t. To what extent is v_x constant? Fit a linear model to your graph of v_y; what is the value of y acceleration? Does it match what you would expect, and does it match the value that you found from the graph of y vs. t?

Your own video

Next, choose something to analyze yourself with video analysis. If you can't think of anything better, you could film a coffee filter (or a stack of them) dropping and determine how long it takes for it to reach its terminal speed.

You can use your own phone to record a video, or we have cameras that you can use. Remember that you need to include something in the frame to set the scale; it should be in the plane of motion of the object, and it might be a measured dimension on the moving object itself. Import your video into Logger Pro, and analyze it as you did with the basketball.

Other tasks for today

- You should tell me about your ideas for an experimental project.
- You should continue working with your group on your computational project.

Computational project presentations

In your group's presentation on Nov. 30, you will need to

- introduce the computational problem,
- outline the structure of your program,
- demonstrate it (it should produce an animation that will be interesting to watch), and
- explain the scientific conclusions that you can draw from experimenting with the program and observing the output.

You will need to prepare visual slides to accompany your presentation.