

### Project #4

**Instructions:** Each project will consist of one or more problems or tasks. You can work on the details of problems with others. In fact, I encourage you to do so. Get a group of two or three people together, find a blackboard, and go to it.

For each project, you will submit a carefully written report on your results. All of your writing should be done independently even if you have worked on details with others. Your report should be self-contained so that a reader can understand the context and results without having read the problem statement.

For your writing, you should consider the audience to be familiar with the material we have seen so far in this differential equations course but who have not looked at the particular problems at hand. You should include enough detail so that a reader in this audience could follow your reasoning and reconstruct your work. In your writing, focus on being precise, concise, and clear.

You should write using the style and tips given on the handout “Notes on writing in mathematics”. When appropriate, you should include carefully drawn or printed figures and plots. Since typesetting mathematics is difficult, you can write project reports neatly by hand. Another option is to use a word processor and then write mathematical expressions in by hand. You can also use an “equation editor” if one is available in your word processor but this can be time consuming so you need not do so.

The project is due in class on Monday, May 2.

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For this project, we will return to the paper “Reduction of HIV Concentration during Acute Infection: Independence from a Specific Immune Response”, Andrew N. Phillips, *Science*, New Series, Vol. 271, No. 5248 (Jan. 26, 1996), pp. 497-499. In Project #1, your goal was to explore how the real-world interactions of lymphocytes and virions are modeled by the given system of differential equations. For this project, you should apply ideas and tools from this course to analyze the model. In your work, you should strive for independent insights rather than just following the analysis done by the author. To start, you might want to grab the model equations and parameter values from the paper without reading the analysis and results. After you do some independent thinking, you might later compare your results and insights with those given by the author. Your major conclusions are likely to be similar to those in the paper; you should strive to reach them independently.

For your report, you can start with the work you did for Project #1 so that this report is self-contained starting with a description of the model and then going on to your analysis, results, and insights.