

Ph11 First Hurdle (2009)

In the words of a song during my childhood:

“Mares eat oats, and
Does eat oaks, and
Little lambs eat ivy.”

Considered in an ecological sense, we have three species each of plant and animal life that interact in finite geographical area.

Supposing that we start out this system with roughly equal numbers of the six species, determine the way the system changes with time.

Rules: Clearly state all assumptions made. You may use any reference you like, but you cannot collaborate*. The use of computers, etc. is ok. The hurdles are due before Monday, October 27, 2008 by 5 PM in 212 Sloan Annex. You will be able to pick up the second hurdle at that time.

You can find a description of Ph11 in the Caltech catalog. On the basis of your performance on this and the second hurdle, you may be offered admission to Ph11, which includes pay for summer (2009) research at Caltech at the current SURF rate, which was \$6,000 for ten weeks in 2008. Usually 4-8 students are admitted to Ph11 every year. You do not have to be enrolled in PH10 to be eligible for Ph11.

**For the purpose of this competition, “collaborate” means that you cannot work together with other students, teachers, etc. You cannot ask anyone how you should attack the problem; however, you can ask people about suitable references to techniques that might be applied to the hurdle’s solution.*