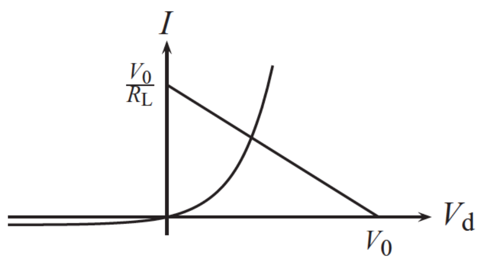
Physics 364, Fall 2014, reading due 2014-09-14.

Email your answers to `ashmansk@hep.upenn.edu` by 11pm on Sunday

Course materials and schedule are at `http://positron.hep.upenn.edu/p364`

Unfortunately, I have not yet written notes on diodes to supplement Eggleston's book. So the rest of this handout is borrowed from the notes for Harvard's *Physics 123*, which was my favorite course in college. (Profs. Goulian, Johnson, and Kikkawa learned electronics from the same course!) The attached notes will first review a few filter topics, and will then discuss diodes. You don't need to read as carefully this week as in other weeks. Aim to spend 1 to 1.5 hours total. (The attached notes are only available as a photocopy handout, not a PDF, per the author's request.)

Assignment: (a) First read through the attached notes. They map pretty well onto our Labs 5 and 6. (b) Then quickly read/skim through Eggleston's §3.2.1–3.2.6 (pp 80–97), which cover the diode circuits we'll see in Lab 6. (c) There is no need at all for you to read §3.1 (pp 68–79), but you could skim it if you're curious about the physics of *p*-*n* junctions. (d) Then email me your answers to the questions below.



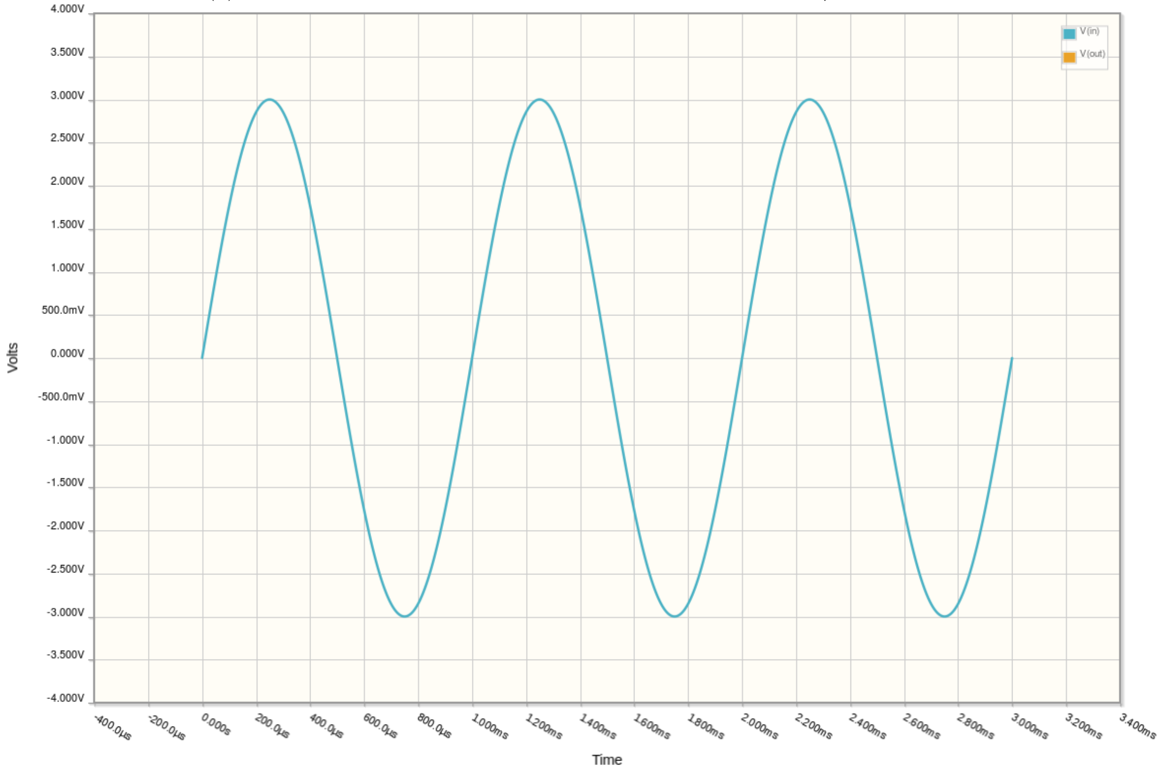
1. What is the point of drawing a graph like the one shown in the above figure? What do the two curves represent, and what is the meaning of the point at which the two curves intersect?

2. In all four circuits below (on the next pages), $V_{\text{in}}(t)$ is the 6 V_{pp} sine wave shown in graph A. For each schematic (I, II, III, IV), which graph (B, C, D, E) shows $V_{\text{out}}(t)$ for that circuit? The time and voltage scales are the same on all graphs.

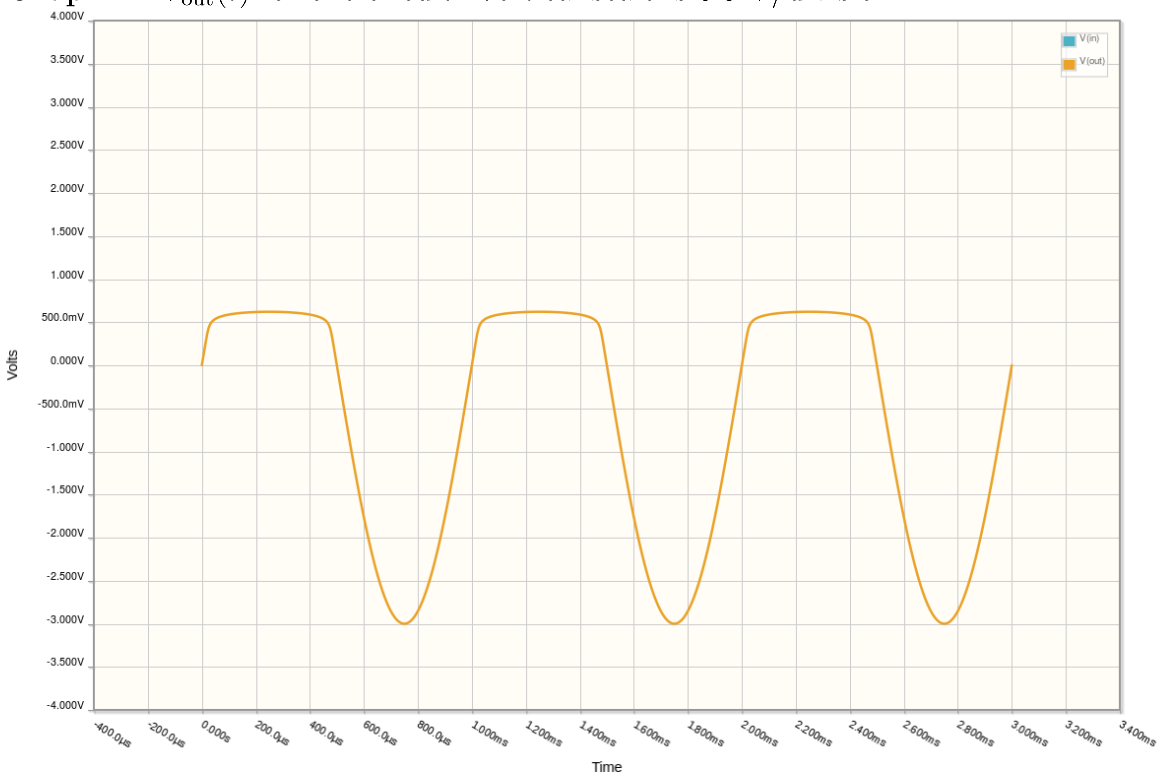
3. Is there anything from this reading assignment that you found confusing and would like me to try to clarify? If you didn't find anything confusing, what topic did you find most interesting?

4. How much time did it take you to complete this assignment?

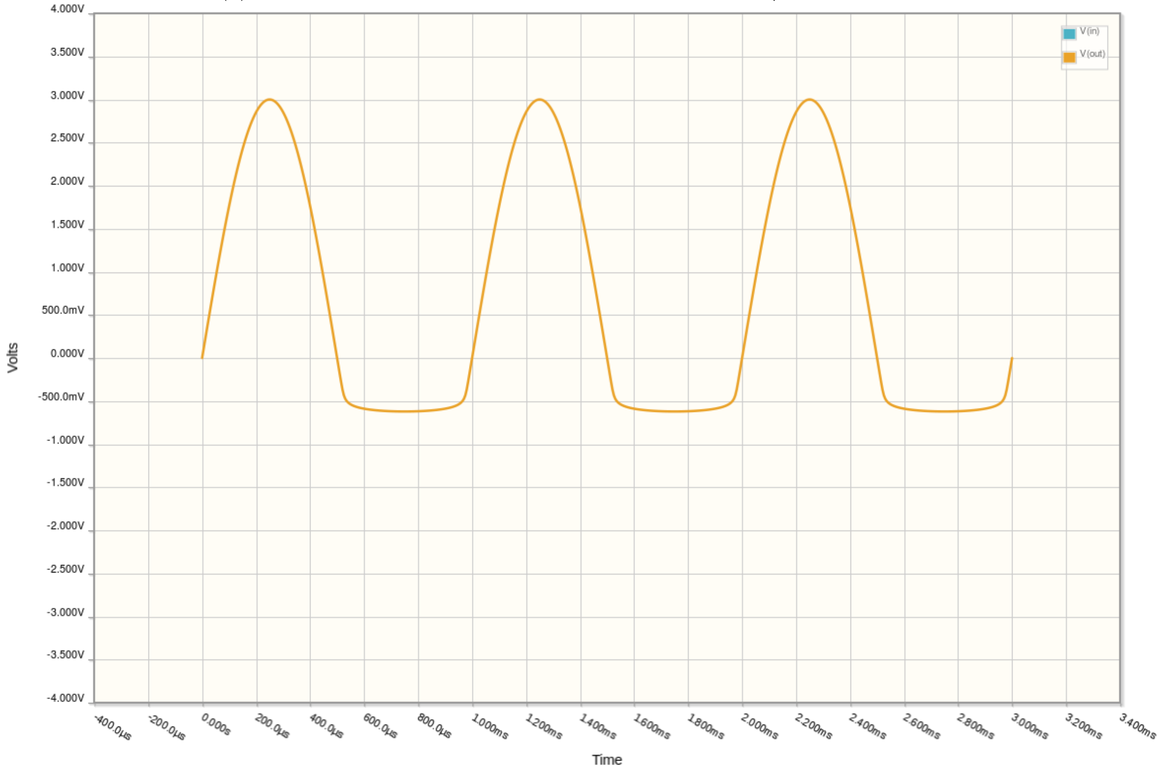
Graph A: $V_{\rm in}(t)$ for all four circuits. Vertical scale is 0.5 V/division.



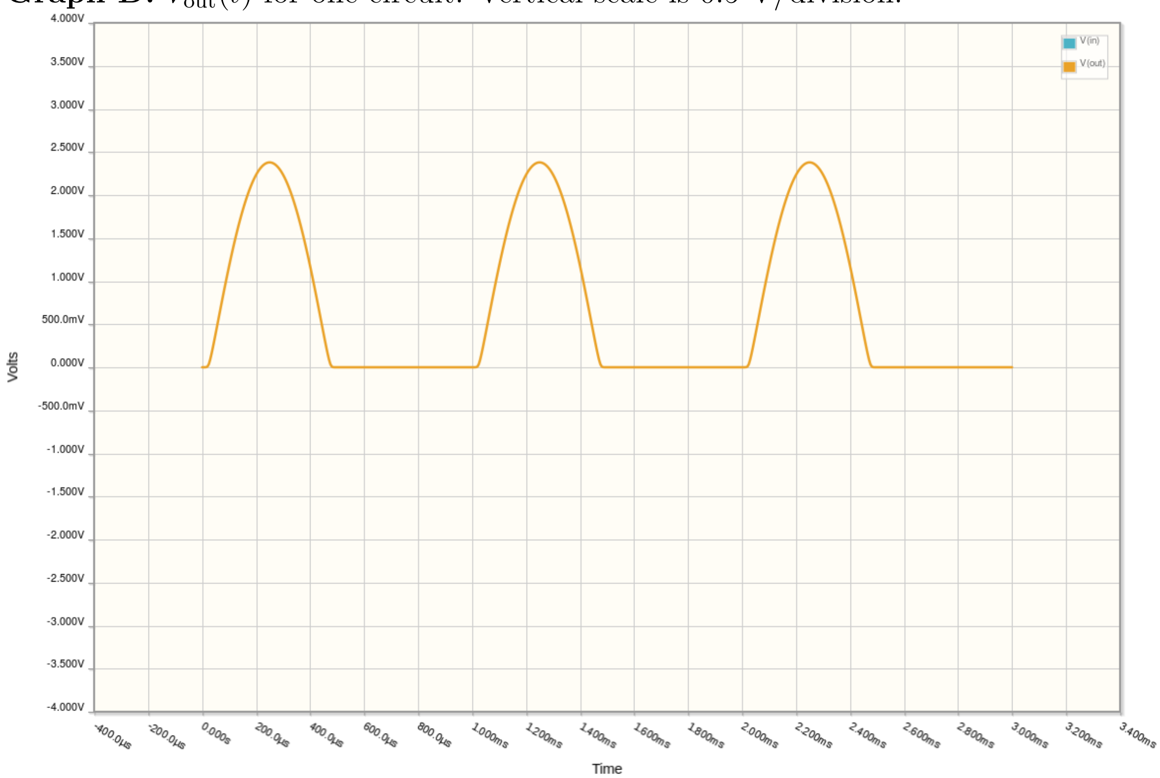
Graph B: $V_{\rm out}(t)$ for one circuit. Vertical scale is 0.5 V/division.



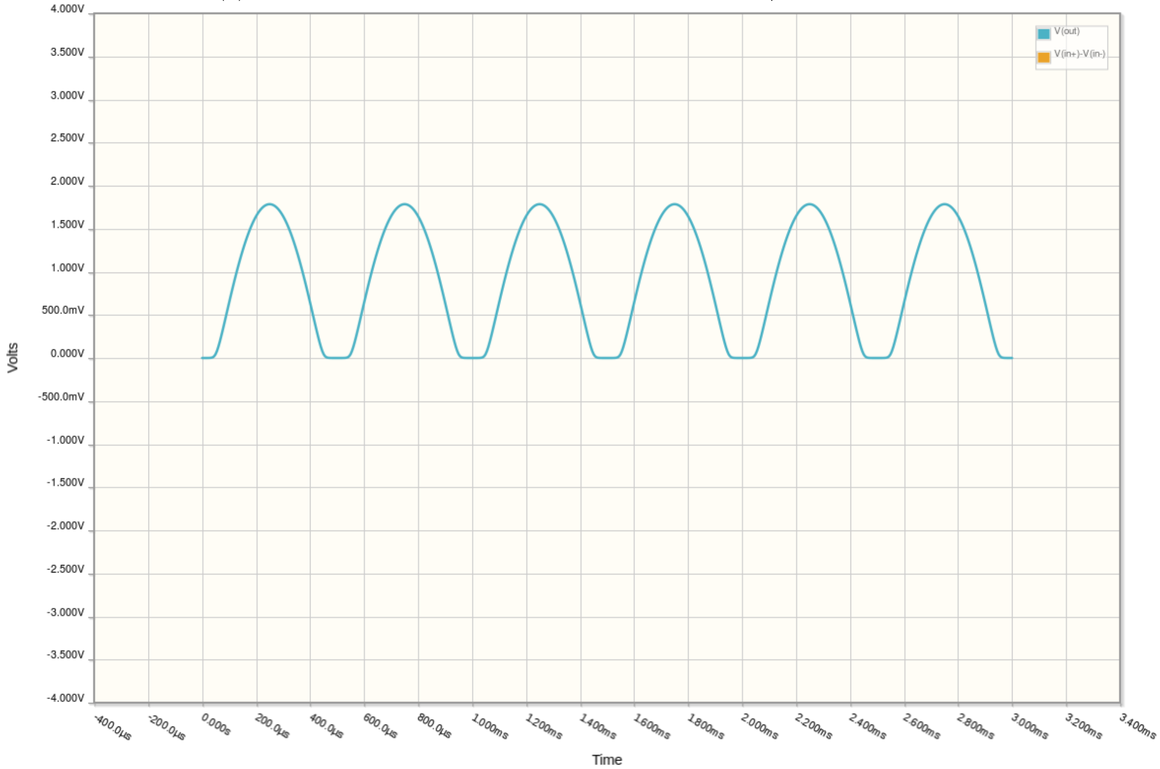
Graph C: $V_{\text{out}}(t)$ for one circuit. Vertical scale is 0.5 V/division.



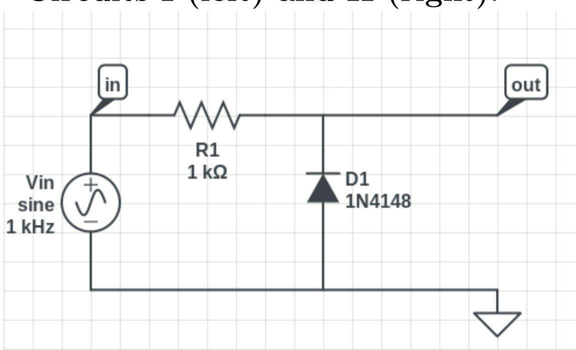
Graph D: $V_{\text{out}}(t)$ for one circuit. Vertical scale is 0.5 V/division.

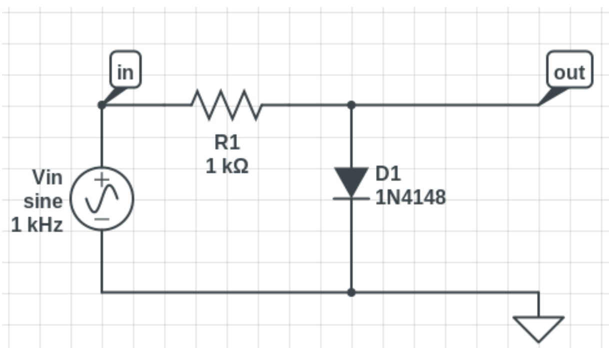


Graph E: $V_{\text{out}}(t)$ for one circuit. Vertical scale is 0.5 V/division.



Circuits I (left) and II (right):





Circuits III (left) and IV (right):