Vibrations Waves and Optics - PHYS 2300

2nd Assignment

due in the course drop-box by

9:55am, Tuesday, September 16, 2014

*No partial marks for late submissions*

Reading: make sure you study pages 7-16 and 19-29 of the textbook (*Vibrations and Waves* by A.P. French). Try doing the math that the book does to really make sure you understand what’s going on.

Do the following problems. All problems have equal weight.

Hints for the complex number problems #1-3 below:

Hint 1: Recall that a complex number *z* can be expressed both in Cartesian and in polar coordinates, *z = a + jb = |z|(cosθ + jsinθ).* These two forms are completely equivalent. You may also find trig identities of the form *2cos(u)cos(v) = [cos(u-v) + cos (u+v)]* etc. to be useful; if you don’t remember these identities, you can find them either online or in one of your old math textbooks.)

- OR -

(Hint 2: Alternatively, recall that the complex number *z* can be also written in its exponential form *z = a + jb* =|*z*|*ejθ* (because of Euler’s formula), where |*z*| is the length: |*z*| = (*a2+b2)1/2.* Using this exponential form can make the complex number problems extremely simple. Be brave and try it!

* 1. Problem 1-1 in French
  2. Problem 1-3 in French
  3. Problem 1-5 in French
  4. Problem 1-10 in French. **Note that there is a typo in the book**: the first equation should be: *d2y/dx2 = -k2y*.
  5. Problem 2-1 in French. Hint: use vector diagrams to help your thinking.
  6. Problem 2-2 in French
  7. Problem 2-3 in French