

Problem Set #8

Physics 302

Tuesday, 02 April 2024

The following problems come from *Vibrations and Waves* (1971), by A. P. French.

- Problem 5-2 on page 153 \Rightarrow (10 points) This is a good warm-up problem to make sure you understand the various frequencies.
- Problem 5-4 on page 153 \Rightarrow (15 points) As the book does and as we do in class, determine the normal frequencies by equating two expressions for C/C' . When describing the normal modes of oscillation, note which mode is symmetric and which one is antisymmetric.
- Problem 5-6 on pages 153-154 \Rightarrow (20 points) You work with a simpler version of the system in Problem 5-4. Feel free to try this problem out on the air track in the lab. After solving part (b) for $x_A(t)$ and $x_B(t)$, plot both on the same graph using *Mathematica*. Use real units. Keep the vertical axis between -6 cm and 6 cm; use $0 \text{ s} \leq t \leq 20 \text{ s}$ for the horizontal axis.
- Problem 5-9 on page 155 \Rightarrow (15 points) You examine a model of a CO_2 molecule in this problem. A good understanding of CO_2 is important for those interested in global warming.

Due date: **Thursday, 11 April 2024** (*beginning of class*)