

Homework 4

Due Friday, September 28th at 5pm

Read Chapter 7 of Taylor's Classical Mechanics.

1. Taylor 6.17, p233
2. Taylor 6.10 & 6.20, pp 232 & 233
3. Taylor 6.21, p234
4. Taylor 6.22, p234
5. Taylor 6.25, p234

As mentioned last week, I include problem 5. in part because it has a nice connection with the oscillations material you've been thinking about. A regular pendulum makes a very good clock (this was Galileo's astonishing insight) but it doesn't make a perfect one. (Why not? Hint: There are multiple reasons.) But, by thinking about the results of Taylor 6.25 Huygens' concocted a brilliant pendulum that is theoretically a perfect clock! Can you think of a way to construct such a pendulum? [Hint: It's a bit like your homework problem with the pendulum wrapped around the cylinder. You want to change how the pendulum swings.] Unfortunately, Huygens' idea isn't practical; it turns out that there is too much friction and it ends up being a worse clock in practice than the good old pendulum bob.

6. Taylor 7.8, p282