

## Homework 2

Due Tuesday, January 31st at 5pm

Read Chapters 4 and 5 of Hartle's *Gravity*. Warning: The problems 5 and 7 are both challenging and shouldn't be left to the last minute. They are well worth it though, they both yield fascinating results.

1. According to clocks on the ground, two streetlights A and B situated 4 km apart were turned on precisely at 8:00 pm PST:
  - (a) Which one turned on first according to passengers on a high-speed train moving from A straight toward B at a speed of  $3/5c$ ?
  - (b) How much later (in seconds) did the other light turn on?
  - (c) In the frame of the earth, are the events corresponding to the lights turning on space-like, light-like, or time-like separated?
  - (d) How about in the frame of the train?
2. Hartle 4.3, p73
3. Hartle 4.9, p74
4. Hartle 4.18, p76
5. Hartle 5.7, p100
6. Hartle 5.13, p101
7. Hartle 5.15, p101