

Core Ideas of Unit 6 – Trip to Canopus

This unit explores the famous and often misunderstood Twin Paradox. Perplexing yes, but the so-called paradox is just a natural consequence of special relativity.

As is emphasized in the chapter, velocity is the ratio of distance to time measured in some free-float reference frame. It is easy to get confused and make the mistake of dividing distance in one frame with time measured in another. So stay alert!

Assignment for Unit 6

- 1) Keeping the core ideas in mind, carefully read through **Chapter 4: Trip to Canopus** in its entirety.
- 2) Now start re-reading the chapter with pencil and paper in hand.
- 3) Why are the travelers so confident that the rocket clock and their biological clocks will run at identical rates?
- 4) After carefully reading section 4.6, **Twin Paradox**, be able to explain why the clock of the twin that accelerates ticks off less time than the clock of the twin who stays in the same free-float frame for the entire trip.
- 5) Section 4.9, **Relativity of Simultaneity** contains a very interesting analysis of the Twin Paradox.
- 6) This is a good place to invoke the view seen by the faraway observer. Be able to explain what this privileged observer “sees” as the trip progresses. In particular, what does she see when Earth frame clocks read 0, 101, and 202 years. Use figure 4.1 to help guide you.
- 7) Are you convinced that the Twin Paradox is not a real paradox? If not, be ready to explain why you are not convinced.
- 8) Do practice exercises 4.1, 4.2, and 4.3.
- 9) When finished with the practice, bring them by my office. If everything looks okay, you will be given a quiz to test your mastery of the material in Unit 6.