

Physics 725: Special and General Relativity

Thornton 335, San Francisco State University

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Fall 2011, MWF 3:10PM

Homework 5 Due 10/26

While I may have consulted with other students in the class regarding this homework, the solutions presented here are my own work. I understand that to get full credit, I have to show all the steps necessary to arrive at the answer, and unless it is obvious, explain my reasoning using diagrams and/or complete sentences.

Name

Signature:

1. Hartle 9.21
2. Show that if we start with the Schwarzschild metric in Eddington-Finkelstein coordinates, using the same procedure as in Chapter 9, we recover the equation of motion (9.29).
3. Modify the Mathematica notebook on the course website to work using Eddington-Finkelstein coordinates. Make an orbit that falls all the way into the $r = 0$ singularity. Plot r vs. v for this orbit.
4. Hartle 12.4
5. Hartle 12.6