

Physics 130 General Relativity Seminar

Assignment 5 February 17, 2011

Part 1: Readings

Cheng: Chapters 6 (GR as a Geometric Theory - I)

Cheng: Chapters 14 (GR as a Geometric Theory - II)

Amanda Peet GR Lectures - Appropriate pages.

Other sources among references on website or books in my office.

Part 2: Review Questions from Text

You must do the readings BEFORE attempting the problems in order to get a good grasp of the overall content of the week's material to be understood. A problem should then make you look more carefully at specific parts of the readings that are necessary for the solution of that particular problem!

Suggested answers in textbook.

Will be discussed first in seminar.

Participation in discussion = 10% Seminar grade.

Any other questions about readings.

1. Look them over and make sure you have no unanswered questions.

Part 3: Everyone Problems

Everyone must understand these solutions.

Most solved in back of textbook.

Only look at solutions if completely stumped!

Will be discussed second in seminar.

Random choice of presenter.

Quality/correctness of presentation = 40% Seminar grade.

1. Cheng: 6-2 Spatial distance and spacetime metric
2. Cheng: 6-3 Non-Euclidean geometry of a rotating cylinder
3. Cheng: 6-4 Geodesic equation in a rotating coordinate
4. Cheng: 14-2 Vacuum Einstein equations

5. Cheng: 14-3 Friedmann equations and energy conservation

Part 4: Extra Problems

One seminar member has overall responsibility for each problem.

Solve as many as you can.

Attempting zero beyond your responsibility is NOT an option!

You will not understand solutions without attempting a problem.

Volunteer presenters OK. Never volunteering is NOT an option!

1. Cheng: 6-5 The geodesic equation and light deflection _____
2. Cheng: 14-4 The equation of geodesic deviation _____
3. Cheng: 14-5 From geodesic deviation to NR tidal forces _____
4. Cheng: 14-6 Relativistic spin precession _____
5. EP #30 A Two-Dimensional World _____
6. EP #31 Timelike Geodesics _____
7. EP #32 More Geodesics _____
8. EP #82 Does It Transform Correctly? _____
9. EP #84 Strange Metric _____