

September 10, 2008

**PHYS 6333 (General Relativity)**

**Assignment #3, Due Wednesday pm September 17, 2008**

1. Read: Ch. 5 of Hughston & Tod.
  - (a) Prove the transformin law for connection symbols  $\Gamma_{bc}^a$  as given in the first equation (not numbered) of Ch. 5. Prove it by assuming that equation (5.2.1) defines the components of a tensor field of type  $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ .  
(I don't think the  $J_b^a$  notation is very helpful, e.g. equation (5.1.1). I would stick with the usual partial derivatives.)
  - (b) Given a flat connection for Minkowski space (i.e.,  $\Gamma_{bc}^a = 0$  for all  $a, b, c$  in rectangular Cartesian coordinates) compute the connection symbols in spherical polar coordinates.
  - (c) Work problem 5.1
2. Read: Ch. 8 of Rindler and Ch. 6 of Hartle.