MA 4448
Assignment 3
Due 9 March 2011

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1. In the next problem, you will be asked to compute all non-zero components of the curvature tensor R_{abcd} for the metric whose non-zero components, in coordinates u, v, x, y, are

$$g_{uv} = g_{vu} = \frac{1}{2} \quad g_{xx} = g_{yy} = \frac{1}{4}\frac{(u+v)^2}{(1+x^2+y^2)^2}$$

   To preserve your sanity and that of the person marking the assignments, you should use the definition

$$R_{debc} = g_{ae}(\Gamma^a_{bd,c} - \Gamma^a_{cd,b} + \Gamma^f_{bd}\Gamma^a_{cf} - \Gamma^f_{cd}\Gamma^a_{bf})$$

   as little as possible. Which components do you need to compute from the definition, and how can you get the others?

2. Compute all non-zero components of the curvature tensor R_{abcd} for the metric from the previous problem.