

Home assignments 2, Gravitation & Cosmology, 2007

To be handed in Friday, December 14

1. Consider a spherically symmetric and static solution of Einstein's equation in three space-time dimensions, describing a point particle with mass M . Give the explicit solution. Is this space-time flat? Will there be gravitational lensing?
2. In the Schwarzschild geometry, which circular orbits are lightlike geodesics?
3. Construct all Killing vectors explicitly for the two-dimensional sphere and the Poincaré disk. Use whichever coordinate system you find suitable.