general relativity – october 17

material discussed in class

Roughly 4.1, 4.2, 5.1, 5.2 in the book.

exercises

- Carroll exercise 3.3
- Carroll exercise 3.6
- Take an arbitrary function $f(x)$ which is everywhere positive. In $\mathbb{R}^3$, draw the curve defined by $y = f(x)$ and $z = 0$. Next rotate this curve around the x-axis. This will result in a surface which looks like a wiggly cylinder. This surface is obviously rotationally invariant under rotations around the x-axis. Parametrize the surface by x and a polar angle θ in the y, z plane. Find the metric and the Ricci scalar of this surface. For which surfaces does the Ricci scalar vanish?
- (optional) Carroll exercise 4.2