PHYS 480/581
General Relativity

Homework Assignment 7
Due date: Tuesday 03/05/2024 5pm, submitted electronically on UNM Canvas

Question 1 (3 points).

Moore Problem 18.8.

Question 2 (3 points).

Moore Problem 19.6

Question 3 (4 points).

Consider the metric
$$ds^2 = -dt^2 + a(t)^2 \left[dx^2 + dy^2 + dz^2 \right] \tag{1}$$
where $a(t)$ in an increasing function of time (and x, y, z are Euclidean spatial coordinates), which describes a homogeneous and isotropic expanding universe.

(a) Compute the Christoffel symbols for this metric.

(b) Write down the equation of motion of a point particle in this metric in the absence of external forces and derive the time dependence of its physical three-velocity. Comment on your result.