ADVANCED DYNAMICS — PHY 4241/5227

Final – Problem 2

(1) There are many equivalent formulations. For instance,

(1a) Galilei invariance: The laws of nature are independent of any uniform, translational motion of the reference frame.

(1b) The speed of light in empty space is independent of the motion of its source.

(2a)

$$\triangle t = \frac{\tau}{\sqrt{1-(0.99)^2}} = \frac{\tau}{0.141} = \triangle t = \frac{2.6\times 10^{-8}\, s}{0.141}\,\mathrm{s} = 1.84\times 10^{-7}\,\mathrm{s}$$

(2b)

$$\triangle x = \triangle t \times 0.99\, c = 54.7\, m \quad (c \text{ speed of light})\,.$$