

Introduction to Philosophy of Physics Homework 4

Spacetime, special relativity, general relativity

Due: 23 April 2018

1. What would it be like to travel at 99.99% of the speed of light?
2. Using a diagram, show how inertial observers moving relative to one another disagree about which distant events are simultaneous. Explain your diagram.
3. Using a diagram, explain the twin paradox in special relativity.
4. *Extra credit.* Explain the difference in the measured time dilation in the Hafele-Keating experiment between the eastward and the westward trips.
5. What do you think is the most promising presentist response to the Putnam-Rietdijk argument? Explain and defend your choice, and discuss the problems of your chosen response.
6. In general relativity, the debate among different metaphysical positions concerning time (presentism, growing block, eternalism, etc.) gets complicated by two facts. On the one hand, not all general-relativistic spacetimes permit a foliation into time slices. On the other hand, in some spacetimes, there is a naturally privileged choice of foliation into time slices available. What do you think is the impact of these two facts on the metaphysical debate? Explain your answer.