

Different Types of Time Intervals

Physics II: Modern Physics

College of the Atlantic

1. Anastajia and Beowulf are standing next to each other and they begin running north down a long, straight road. The moment that they both start running is event A. They both run at a constant speed, but Beowulf is running twice as fast as Ana. After 5 minutes Beowulf starts to get lonely and he turns around and runs back toward Anastajia. They are soon reunited and stop running. Call this event B.
 - (a) Who measures a coordinate time between event A and B?
 - (b) Who measures a proper time between event A and B?
 - (c) Who measures the spacetime interval between event A and B?

2. Anastajia bungee-jumps from a bridge above a deep gorge. Beowulf watches from the bridge. Let event D be Anastajia's departure from Beowulf's location on the bridge, and event R be her return to Beowulf's location on the bridge. Cara observes these events from a train passing over the bridge and uses synchronized clocks on the train to measure the time between Anastajia's departure D and return R.
 - (a) Who measures a proper time between events D and R?
 - (b) Who measures a coordinate time between events D and R?
 - (c) Who measures the spacetime interval between events D and R?