# Relative Velocity

Let's first look at how we handle relative velocity in non-relativistic situations.

Consider the following situation.

Starting at the origin, Fred rolls a bowling ball so that it travels at a constant velocity of 2.0 m/s in the positive x-direction.

Plot the ball's worldline, according to Fred, on the spacetime diagram at right.

Remember that b is 1 m/s, so each box measures 1 m wide by 1 m high.
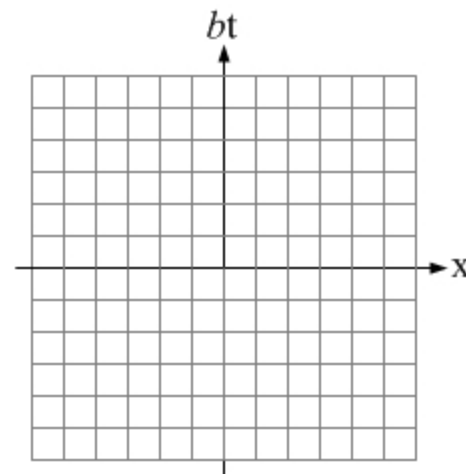
Georgina, traveling at a constant velocity of 1 m/s in the positive x direction, passes through the origin at the instant Fred releases the ball.
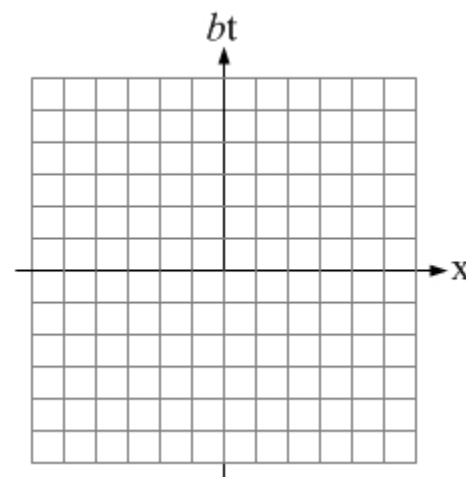
What is the bowling ball's velocity with respect to Georgina?

The spacetime diagram in Georgina's reference frame is shown at right. On this diagram plot worldlines for:

The ball.

Fred.

Georgina.

Hal, traveling at a constant velocity of 2 m/s in the +x direction, passes through the origin at the instant Fred releases the ball.

What is the bowling ball's velocity with respect to Hal?

The spacetime diagram in Hal's reference frame is shown at right. On this diagram plot worldlines for:

The ball.

Fred.

Georgina.