

What is the speed of a small robot (LabVIEW or GEAR5)? 1 m/s

What speed does a car travel?
26.8 m/s (60 mph)

What is the speed of sound
340 m/s

Robot = 1 m/s
Car = 27 m/s
Sound = 340 m/s

Time will it take a signal to travel from the robot & back \rightarrow object is 100 m away?

$$\text{Time} = 100\text{m} * 2 * \frac{1\text{s}}{340\text{m}} = 0.59\text{ seconds}$$

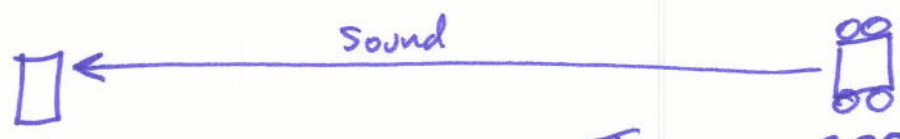
Now, assume the robot/vehicle moves. What is the formula for determining distance & time?

Consider.....

(2)

what will the time be? less than 0.59 seconds

1)



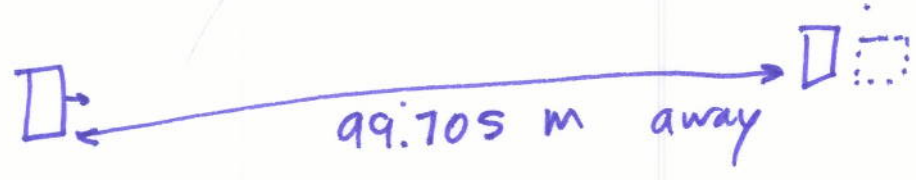
↑
at the
Time when
reades here.....

Time = .295 seconds
robot travelled?

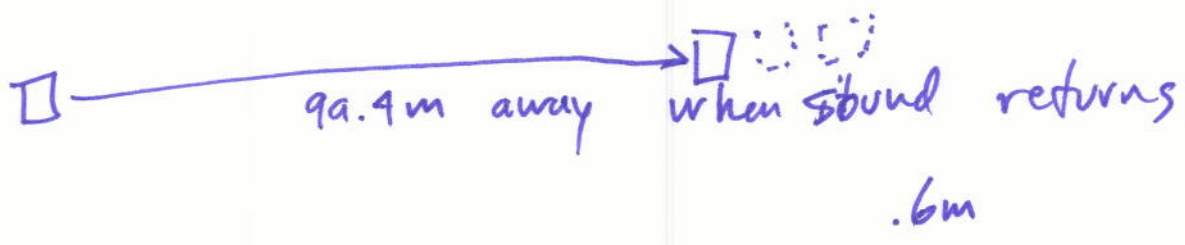
$$\text{distance} = .295 \text{ s} \times \frac{1 \text{ m}}{1 \text{ sec}}$$

$$= 0.295 \text{ m}$$

2) at 0.295 seconds



3)



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$$t = \frac{2d}{s_s + s_r}$$

$s_s =$ Speed of sound (3)
 $s_r =$ Speed of robot
 $d =$ distance

$$t = \frac{200\text{m}}{340\text{m/s} + 1\text{m/s}} = 0.5865\text{s}$$

$$t = \left(x + \left(x - (s_r * t) \right) \right) + \frac{1}{s_s} = \frac{2x - (s_r * t)}{s_s}$$

$$= \frac{2x}{s_s + s_r}$$

Now look at the car 27m/s

$$t = \frac{2 * 100}{390 + 27\text{m/s}} = .5449$$

distance car travelled?

$$0.5449\text{s} * 27\text{m/s} = 14.71\text{m}$$

Auto bahen 59m/s

$$t = \frac{2 * 100}{390 + 59\text{m/s}} = 0.5076\text{se}$$

distance car travelled

$$27.41\text{m}$$