

Physics Education

Laboratory

Lecture 06 - p2

Laboratory for teaching

Kynematica and Dynamics

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Laboratory on Kinematics

Pedestrian
in pink dress

Yellow car

Red car



Yellow car passengers POV

- 2.1 The driver of the yellow car is still
- 2.2 The driver of the red car is moving first towards them, then it passes by and then it moves away
- 2.3 Same for the pedestrian (but slower).

- b. PEDESTRIAN POV
The driver of the yellow car moves closer, passes by and then moves away
- c. The passenger is moving with the car, but he considers himself still
- d. Motion is change of position across time, where position is relative to something considered "still". Motion is "relative" because it depends on the choice of the point of view.

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2.1.1

② yellow { yellow: doesn't move
red: it's approaching in high speed
pedestrian: → low → ;

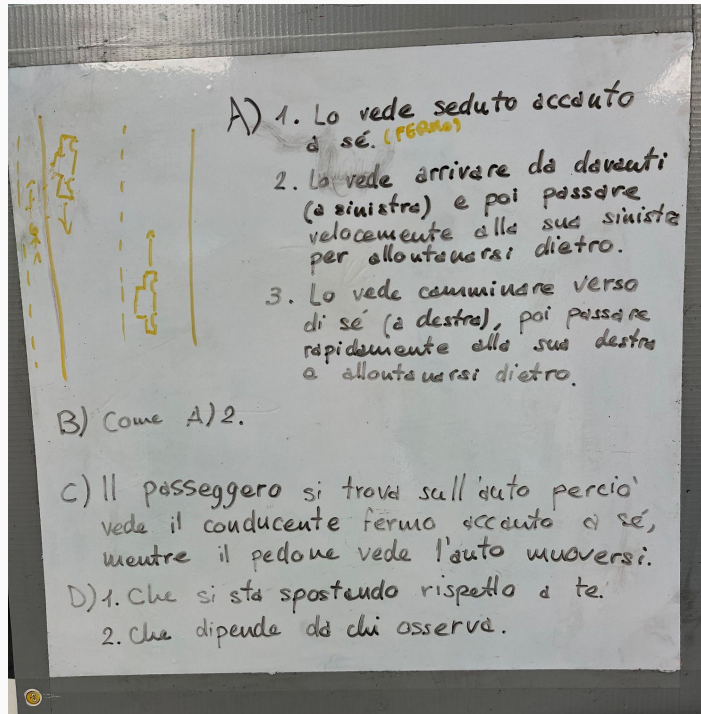
- ⑥ the fastest object coming towards me;
- ⑦ because the pedestrian isn't in the car;
- ⑧ • when an object is moving along the street,
• it depends on the vehicle we are on;

? WHAT IS MOTION? ?

- a) Il passeggero dell'auto gialla vede:
 - fermo il suo guidatore
 - la macchina rossa muoversi verso di lui, alle sue sinistre
 - il pedone muoversi verso di lui alle sue destre
- b) Il pedone vede le macchine gialle muoversi in senso opposto alla sua direzione di camminata
- c) Il passeggero si muove assieme al guidatore, mentre il pedone si muove indipendentemente nel verso opposto
- d) oggetto in

}	Moto:	Cambia la propria posizione rispetto a un punto fermo
	Moto Relativo:	Cambia la propria posizione rispetto a un punto in moto anch'esso

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A) 1. Lo vede seduto accanto a sé. (fermo)
2. Lo vede arrivare da davanti (a sinistra) e poi passare velocemente alla sua sinistra per allontanarsi dietro.
3. Lo vede camminare verso di sé (a destra), poi passare rapidamente alla sua destra e allontanarsi dietro.

B) Come A) 2.

C) Il passeggero si trova sull'auto perciò vede il conducente fermo accanto a sé, mentre il pedone vede l'auto muoversi.

D) 1. Che si sta spostando rispetto a te.
2. Che dipende da chi osserva.

MOTION IN ONE DIRECTION

a. For the passenger of the yellow car, the driver of the yellow car doesn't move, the driver of the red car move faster than the pedestrian, both approaching him.

b. The pedestrian sees the driver of the yellow car approaching to her.

c. Because for the passenger, the driver doesn't move while for the pedestrian he does.

d. "Moving" means how an object changes its position and "motion is relative" means that the motion depends on the reference point.



- a. What patterns did you notice in the placement of the dots?
- b. How can you use the distances between the dots to describe the motion of the bowling ball?

https://mediaplayer.pearsoncmg.com/assets/_frames.true/secs-experiment-video-1

Laboratory on Dynamics

PATTERNS → "one" correspond to the passage of a unit of time (always the same). Every "one" a bag is placed where the ball is.

- "free" ball \Rightarrow equidistant points
ball on the carpet/
pushed ball \Rightarrow NON-equidistant points
- faster ball \Rightarrow further away dots

means

Connecting the points \vee creating the path of the ball.
Measuring the distance between the dots gives us information about the ball's velocity.

2.2.1

- (a)
- • • • • \rightarrow distanza uguale (a parte ultime);
 - • • • • \rightarrow distanza uguale ma maggiore;
 - • • • • \rightarrow la distanza diminuisce con il tempo;
 - • • • • \rightarrow la distanza aumenta con il t;

(b) Se la distanza rimane uniforme \bar{e} perché la velocità non cambia, mentre se diminuisce \bar{o} perché la velocità si sta riducendo, viceversa \bar{o} perché la velocità sta aumentando.

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DESCRIZIONE

1)



5 punti equidistanti fra loro

2)



4 punti equidistanti

3)



4 punti e distanza decrescente

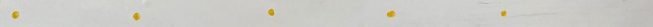
4)



4 punti e distanza crescente

Le distanze tra i punti rappresenta lo spazio percorso dalla palla al trascorrere dello stesso periodo di tempo

1)



2)



3)



4)



- a. In 1) and 2) the points are equally spaced
In 3) the points get closer to one another
In 4) the points get further away from each other
- b. Closer points mean slower movement
Further points mean faster movement
When points get closer the ball is slowing down
When points get further away the ball is speeding up.

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A CONCEPTUAL DESCRIPTION OF MOTION

a.



Begin with long distance and become shorter.

The diagram shows a sequence of five small squares. The distance between the first and second square is significantly larger than the distances between the subsequent squares, which decrease in size from left to right. A curved arrow on the left points to the first square.

Begin with short distance and become longer.

The diagram shows a sequence of four small squares. The distance between the first and second square is the smallest, and the distances between the subsequent squares increase in size from left to right. A curved arrow on the left points to the first square.

b. long distance fast motion ; short distance slow motion.



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