	TEAM: Yellow	
	Belgium	Kaat Clinckemallie Alexander Scheerens Merel Albers Julie Debouvere
Hit that ball!	France	Samuel Pierre
	Italy	Tommaso, Alessia, Ilaria M., Simone, Martino
<b>EXPERIMENT:</b>		

## 1. ORIENTATION

1.1. **Research question:** What's the difference in trajectory of a basketball and a volleyball when we throw them with the same strength?

### Sub-questions:

- What's the relation between the mass of the ball and his trajectory?
- What's the relation between the periphery of the ball and his trajectory?

### 1.2. Hypothesis

The basketball goes further than the volleyball because the strength of the basketball is larger than the volleyball. That's because the ball consists of another material or because there's a difference in how hard the ball is blown up.

## 2. PREPARATION

### 2.1. Material:

- Volleyball
- Basketball
- Camera
- Tracker

- Balance
- Tape
- Ruler

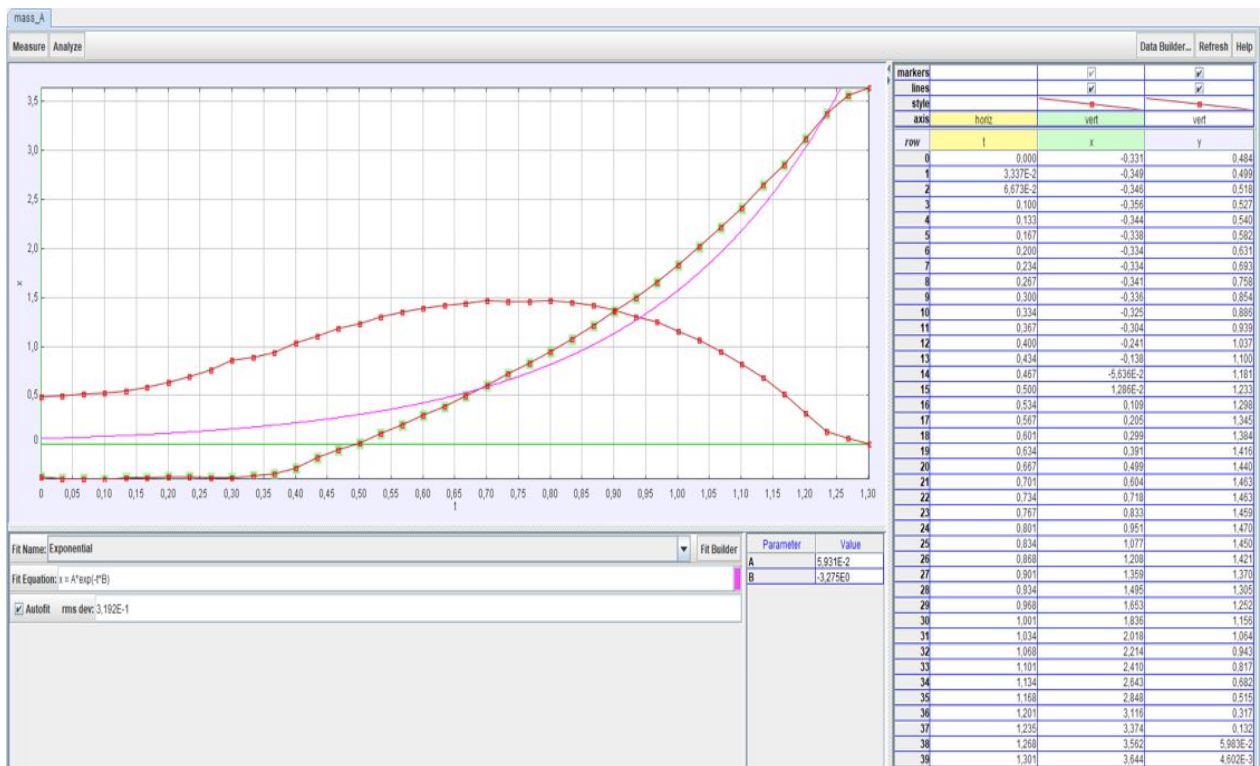
## 2.2. Method:

- Determine the calibration and use the tape to clearly define the starting and the ending point
- Hold the ball against your chest and throw it away from you, meanwhile you film the trajectory, make sure you film the whole trajectory in one shot
- You then do the same with the volleyball
- Put the films on Google Drive

## 3. DATA ANALYSIS and DISCUSSION

### 3.1. Observations and Measurements:

French experiment 1(volleybal): analyze Belgian group



We made a mistake, because we choose the option exponential instead of parable. So our funcion rule isn't correct.

Also the movie wasn't very clear, so it was very difficult to indicate the right calibration.

### French experiment 2 (basketball): analyze Belgian group

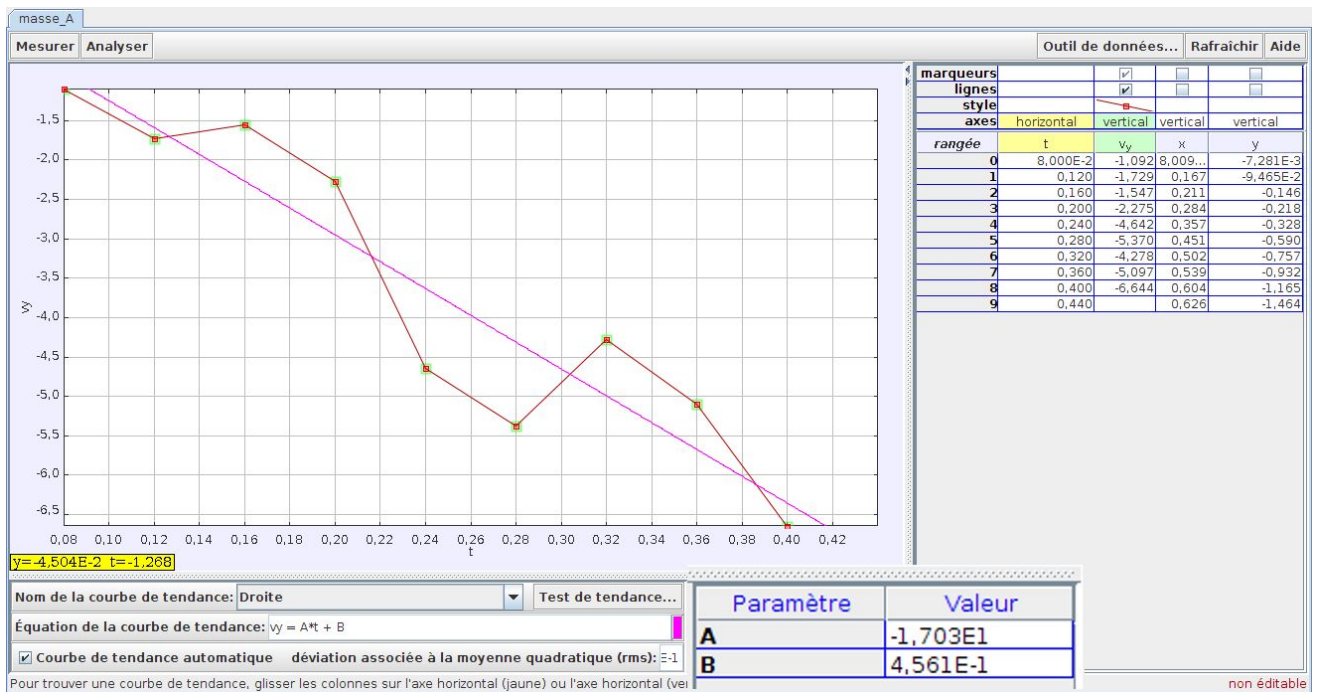
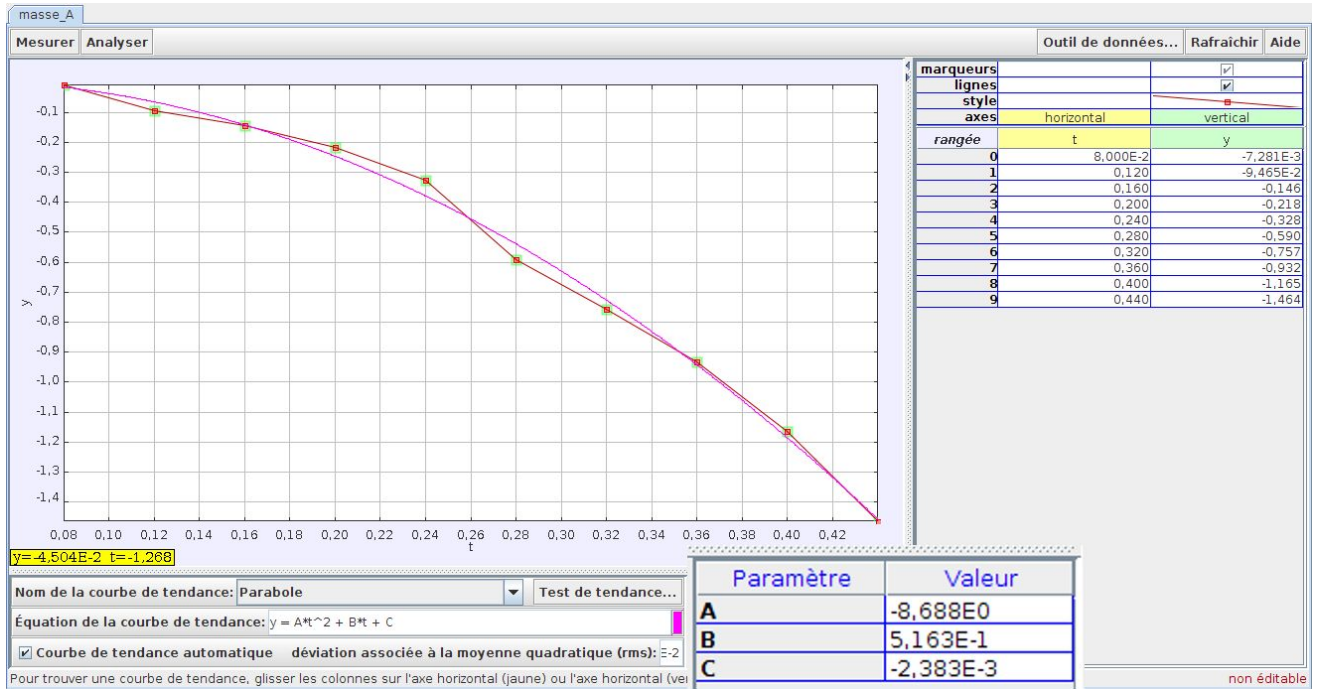


$$x = -0,0185vx^2 + 0,1973vx + 2,733$$

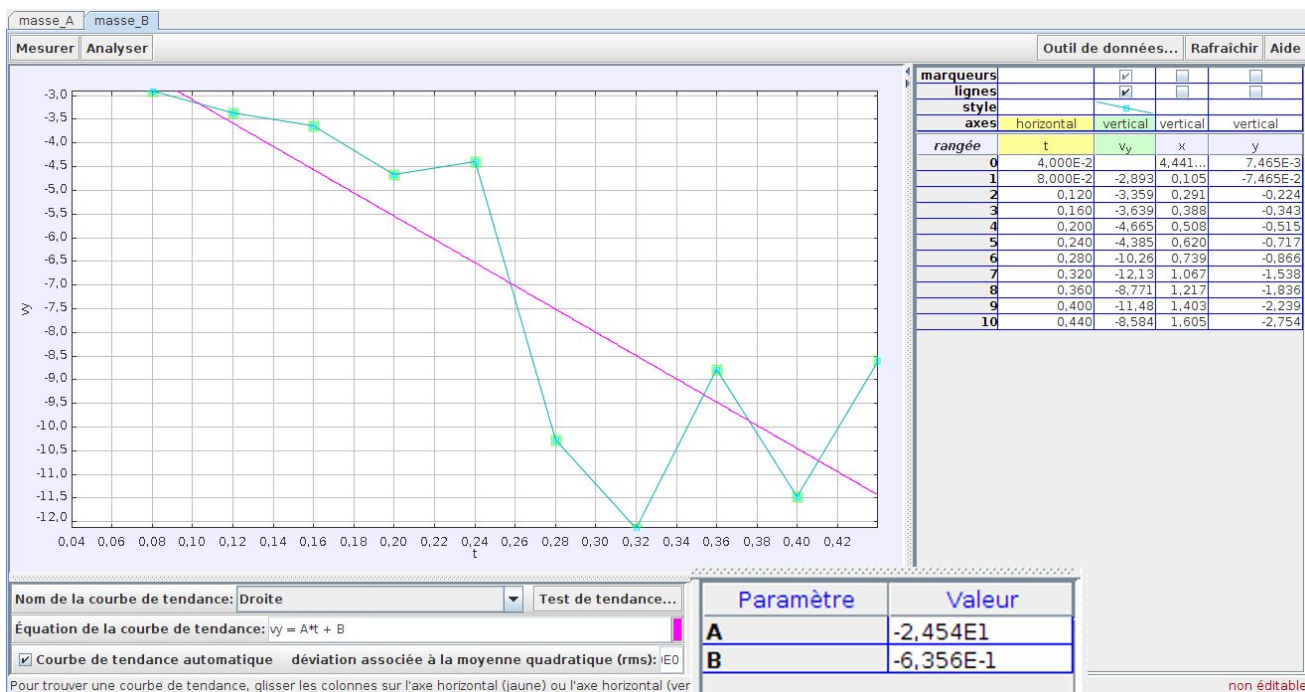
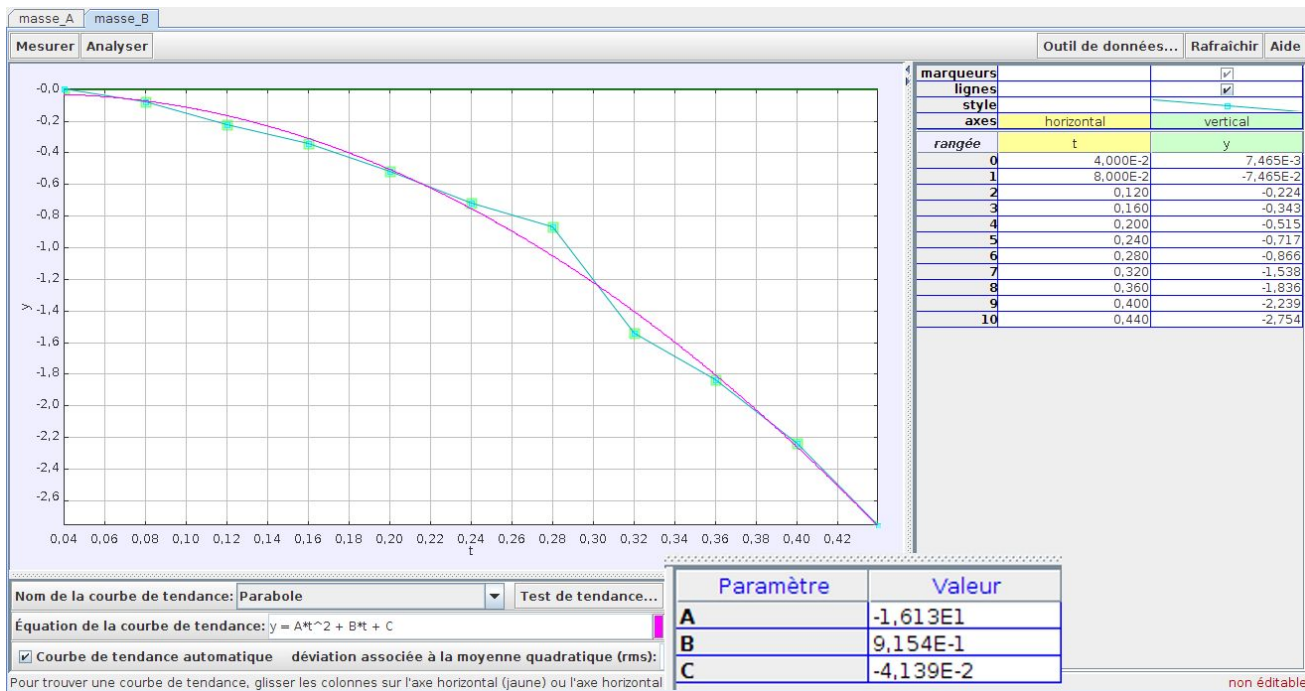


$$v_x = -6,599t^2 - 1,937t + 1,848$$

# Experiment with basket ball from Italy analysed by French discussion by Belgian

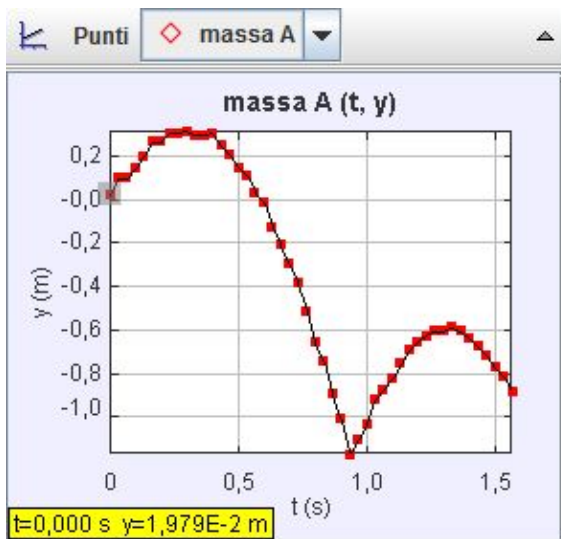


### Experiment with volley ball from Italy analysed by French

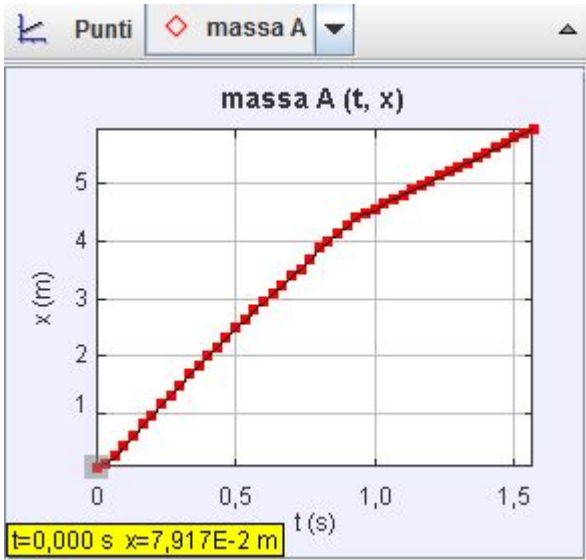


### Belgian Experiment (Volleyball) analysed by Italian team





t (s)	x (m)	y (m)
0,000	7,917E-2	1,979E-2
0,033	0,148	9,896E-2
0,067	0,257	9,896E-2
0,100	0,455	0,148
0,133	0,604	0,198
0,167	0,821	0,267
0,200	0,980	0,267
0,233	1,168	0,307
0,267	1,326	0,307
0,300	1,504	0,317
0,333	1,682	0,297
0,367	1,841	0,297
0,400	2,009	0,307
0,433	2,167	0,247



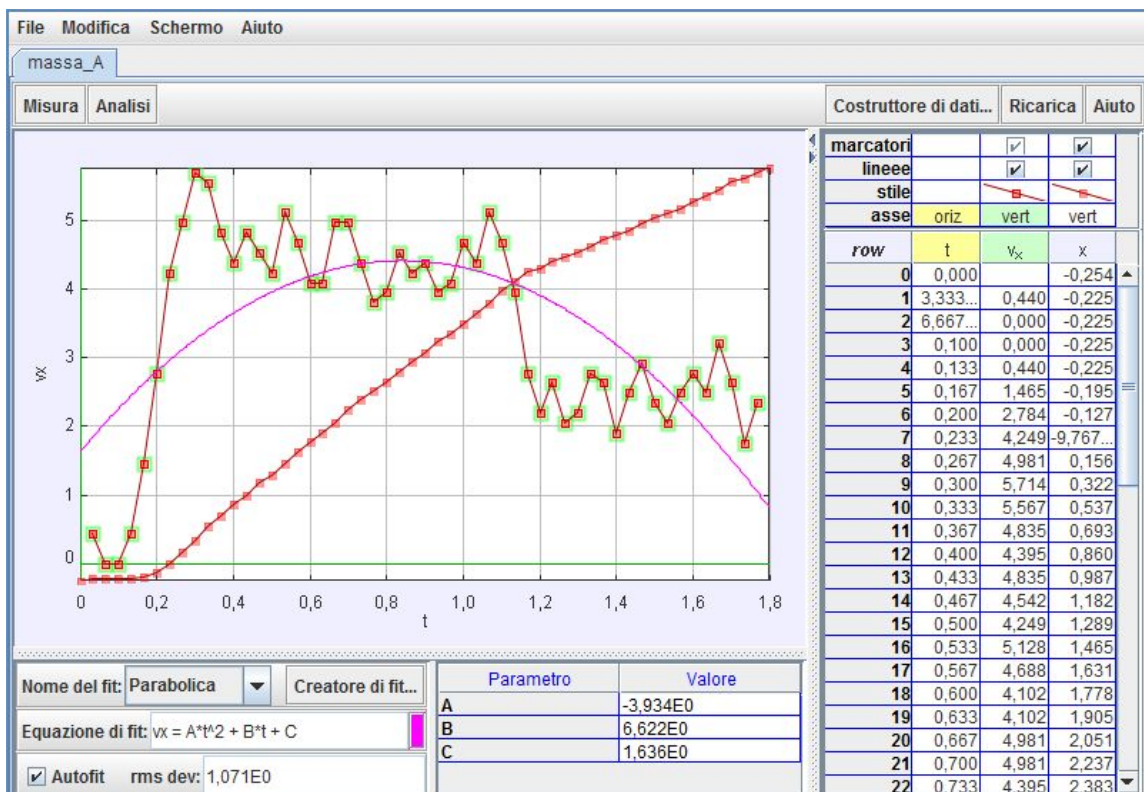
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1.1.



$$v_x = -8,744 \cdot t^2 + (-8,663) \cdot t + 5,178$$

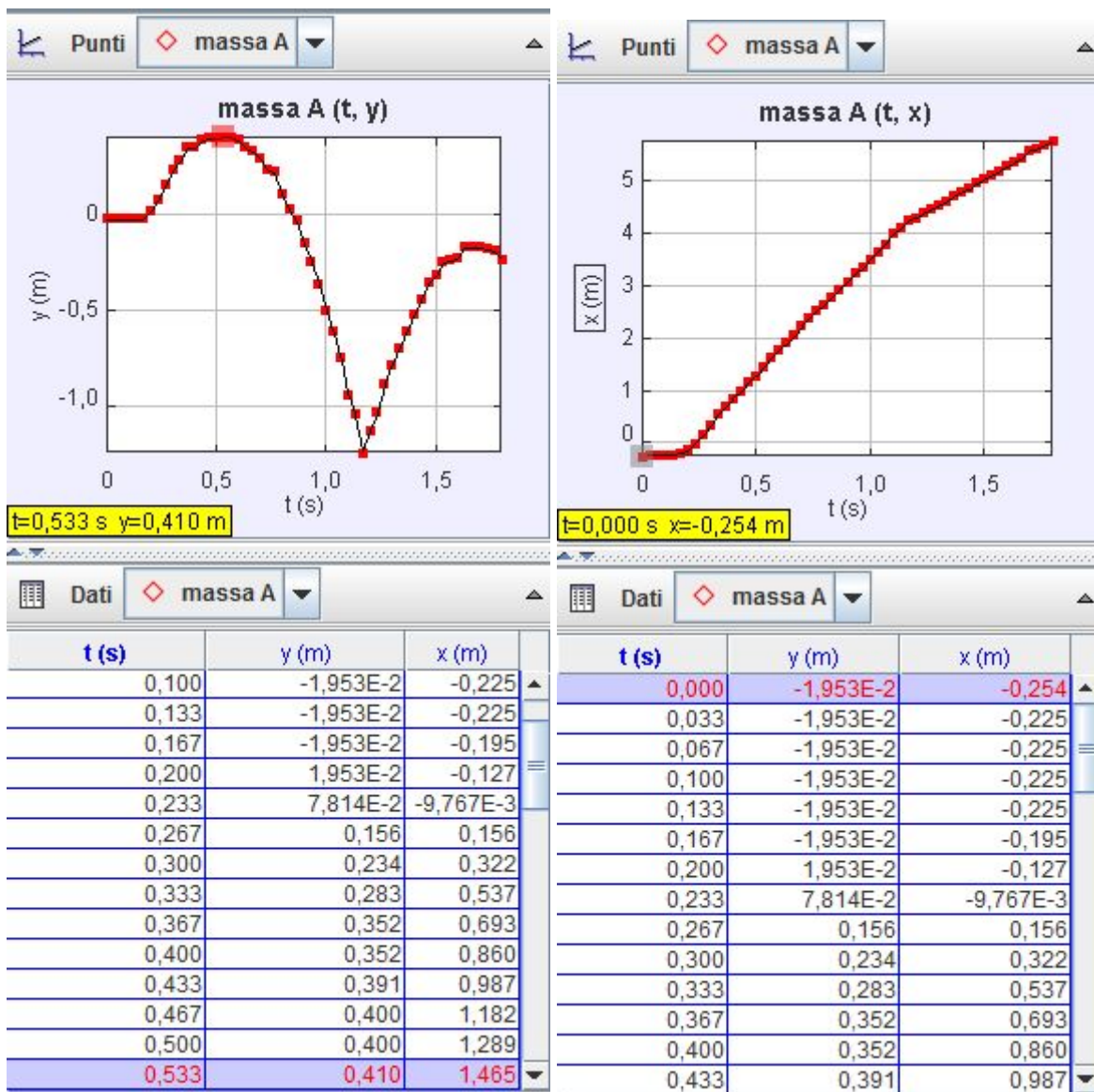
Belgian experiment (Basketball) analysed by Italian team



$$v_x = -3,934 \cdot t^2 + 6,622 \cdot t + 1,636$$

Experiment





### 3.2. Discussion

#### a. made by the Belgian students of the French analysis of the Italian.

At the first sight the graphs look the same but when we take a closer look we can see that there is a difference. If we compare the two place graphs the first

function prescription of the graph with basketball is  $x(t) = -8,688t^2 + 0,516t - 2,383$

the function prescription of the second graph volleyball is:  $x(t) = -1,613t^2 + 0,9154t - 4,139$

The two place graphs are similar, just the place where the ball starts is different, we can see that in the function prescription. The larger the time, the lower the ball.

the function prescription of the speed graph is:

first graph with basketball:  $v(t) = -1.703t - 0.456$

second graph with volleyball:  $v(t) = -2,454t - 0,6356$

We can see that the speed of the volleyball is larger. At the beginning the speed is larger than at the end so the speed reduces in function of time.

The velocity graph is a linear graph.

The difference between the mass of the basketball and the mass of volleyball wasn't very huge so it didn't actually affected the results.

**b. made by the French students of the Italian analysis of the Belgians**

The experience with the volleyball : we see that when the ball touches the ground, the trajectory of the slope (x) gets smaller.

The experience with the basketball : the basketball got the same trajectory, when the ball hit the ground, the axis "x" get smaller.

## 4. REFLECTION

### 4.1. Conclusion:

### 4.2. Comparison of the results of the different countries

### 4.3. Reflection:

## 5. REFERENCES