2D and 3d motion analysis
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BMX trick

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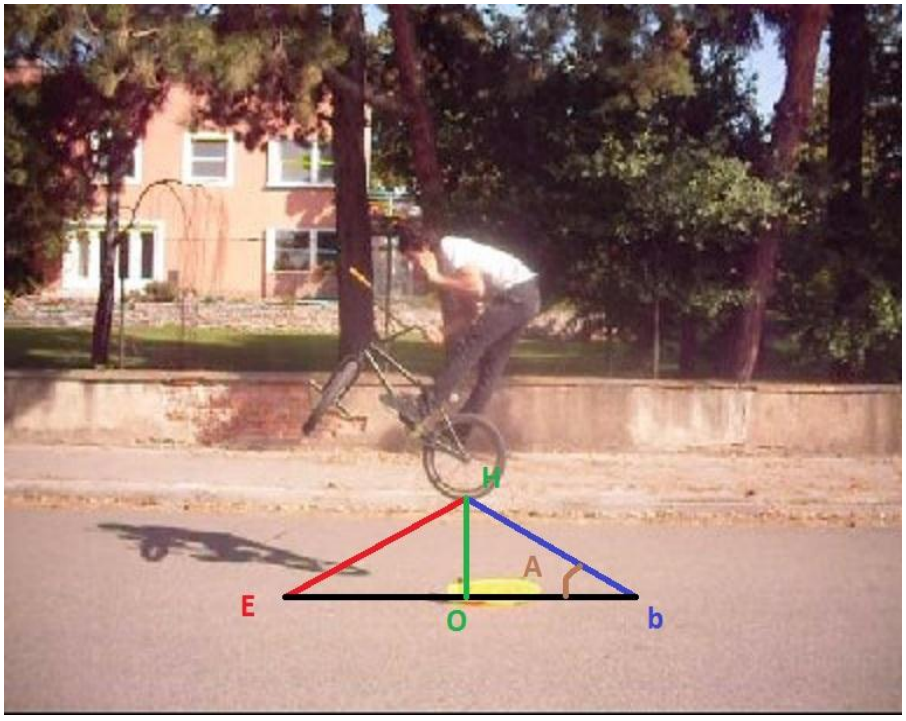
BEGINING : 1 ,93 sec

HIGHIEST :

RECEPTION/ END : 2,53 sec

I pointed with paint differents generals points of the trick :

- b is the point of the begining, b(540 ;480)
- H is the highiest point of the jump, H(395;400)
- E is the last point of the jump , E(240;480)
- O is the vertical image of H on eB distance , O(395;480)
- A is the angle O^bH



About the echelle, the orange skate mesure 60cm.

D(315;400) and I(385;400)

LET'S GO !

LENGHT :

Here, the lenght of the jump is the distance between E and b, and

Eb= v((540-240)²+(480-480)²) = 300px

HIGH OF THE TRICK :

The high correponds to the distance HO, so :

HO=v((395-395)²+(400-480)²=80px

We need to know DI to convert the pixels to cm :

DI= 385-315 = 70px , so 70px = 60cm

Conclusion :

Lenght = (300*60)/70 = 257cm

High = (80*60)/70 = 69 cm

SPEED :

The time of the jump is 2,53-1,93= 0,6 sec

My speed is 2,57m in 0,6 sec. Or 2,57*1,33=3,43 m/s

ANGLE :

tan(b)= OH/Ob Ob= 540-395 = 145px

tan(b)=80/145=0.55

So b =28.8°