

Univerza v Novi Gorici
Fakulteta za aplikativno naravoslovje
Inženirska fizika (I. stopnja)
Fizika I
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VAJE
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Merjenje fizikalnih količin, napake

1. A group of hikers decides to hike up a mountain. The total distance to the top of the mountain is $4825 \pm 5m$. After hiking a distance of $3260 \pm 10m$ the hikers decide to stop and rest. What is the remaining distance that they need to travel to reach the top of the mountain?
2. A camera takes two consecutive pictures of a travel bullet as shown on the figure (slika 1). The time between the two pictures is measured as $1,00 \pm 0,03ms$. Calculate the speed of the bullet.
3. You have just purchased a new Corvette and are testing it out on a road in Italy. An Italian police car patrolling the streets is driving a Lamborghini. If the top speed of your Corvette is $186 \pm 2mph$ while the top speed of the Lamborghini is $309 \pm 5km/h$, will you receive a ticket from the Italian police officer? The conversion $1mile = 1,61km$ has negligible uncertainty.
4. A certain quantity x is measured five times with the following results: 71,72,72,73,71. Calculate the average value and the standard deviation of the measurements. Organize your calculations in a table.

Enakomerno in enakornemo pospešeno gibanje v eni dimenziji

1. The position of a particle moving along the x-axis is given in centimeters by $x = 9,75 + 1,50t^3$, where t is in seconds. Consider the time interval $t = 2,00s$ to $t = 3,00s$ and calculate (a) the average velocity; (b) the instantaneous velocity at $t = 2,00s$; (c) the instantaneous velocity at $t = 3,00s$; and (d) the instantaneous velocity at $t = 2,50s$.
2. A car travels up a hill at a constant speed of 40 km/h and returns down the hill at a constant speed of 60 km/h. Calculate the average speed for the round trip.
3. You drive on Interstate 10 from San Antonio to Houston, half the time at 56 km/h and the other half at 89 km/h. On the way back you travel half the distance at 56 km/h and the other half at 89 km/h. What is your average speed (a) from San Antonio to Houston, (b) from Houston back to San Antonio and (c) for the entire trip?

4. A jumbo jet must reach a speed of 360 km/h on the runway for takeoff. What is the least constant acceleration needed for takeoff from a 1,80 km runway?
5. A rocket-driven sled running on a straight, level track is used to investigate the physiological effects of large accelerations on humans. One such sled can attain a speed of 1600 km/h in 1,8 s starting from rest. Find (a) the acceleration (assumed constant) in g units and (b) the distance traveled.
6. A car moving with constant acceleration covers the distance between two points 60,0 m apart in 6,00 s. Its speed as it passes the second point is 15,0 m/s. (a) What is the speed at the first point? (b) What is the acceleration? (c) At what prior distance from the first point was the car at rest? (d) Graph x versus t and v versus t for the car, from rest.
7. A stone is dropped into a river from a bridge 44 m above the water. Another stone is thrown vertically down 1,00 s after the first is dropped. Both stones strike the water at the same time. (a) What is the initial speed of the second stone? (b) Plot velocity versus time on a graph for each stone, taking zero time as the instant the first is released.