

Uebersicht

Schussmaschine

V-Unihockeyball 180 km/h
50 m/s mm/ms

Unihockeyball

Durchmesser 72 mm
Durchgangszeit 1.44 ms

Motor

Rpm 2000 1/min
2x 4000 1/min
33.33 1/sec

-> da Stab 2 unterbrüche pro Umdrehungen generiert

Radius 0.250 m
Durchmesser 0.5 m
Umfang 1.57 m
V_umf 52.36 m/s
188.50 km/h

0.785398 Abstand Sensoren 0.79 m
delta_t 0.015708 s
15.71 ms

Lichtschranke

Reaktion 0.5 ms

Teststrecke

Distanz 0.1 m
Durchgangszeit 0.002 s
2 ms

Arduino

Clockspeed 16 MHz
16000 Hz
0.0000625 s
0.0625 ms

Lichtschanke

High kein Hinderniss
 Low Hinderniss Wichtig zur Auslösung des Interrupts beim Arduino
 Reaktionszeit unter 1.44ms

Auswahl EX-21A-PN - Einweglichtschranke 1 m PNP

Fehler

Reaktionszeit 0.5 ms
 Abstand Sensor 0.1 m

Spannungsteiler

12V - 5V

$I = U/R$

U 12

U1 7

U2 5

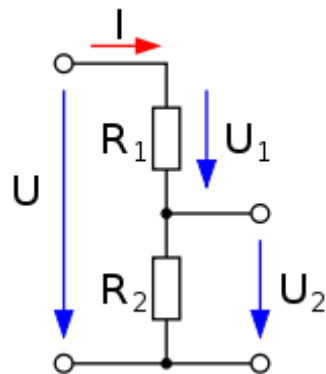
R1 6800

R2 4857.142857 ->

I 0.001029412

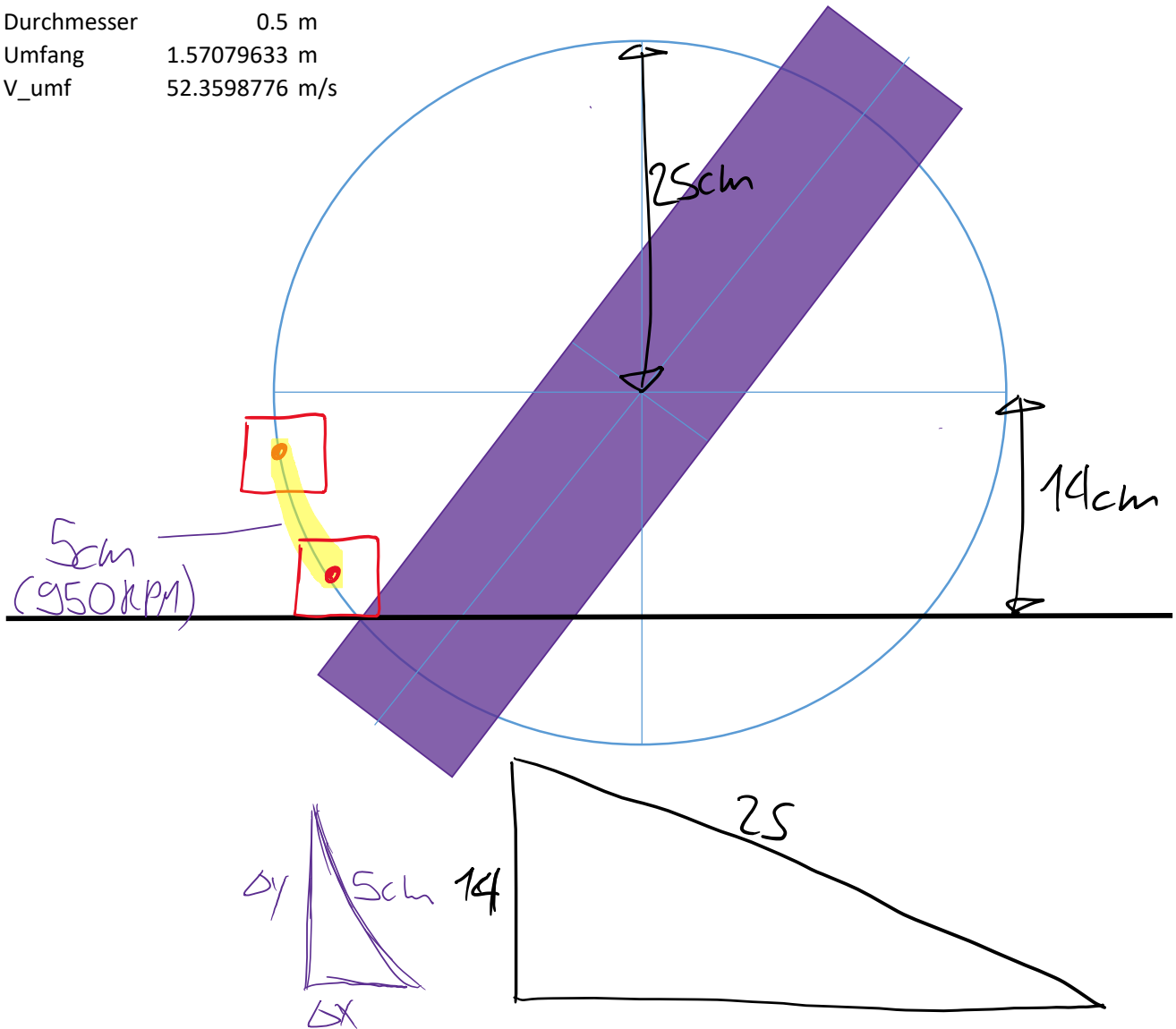
$$U_2 = U / (R_1 + R_2) * R_2$$

4700 4.90434783
 0.00104348



Versuchsaufbau

| | |
|-------------|----------------|
| Uebersicht | 0.785 m |
| delta_t | 0.01571 s |
| | 15.71 ms |
| Rpm | 2000 1/min |
| Radius | 0.25 m |
| Durchmesser | 0.5 m |
| Umfang | 1.57079633 m |
| V_umf | 52.3598776 m/s |



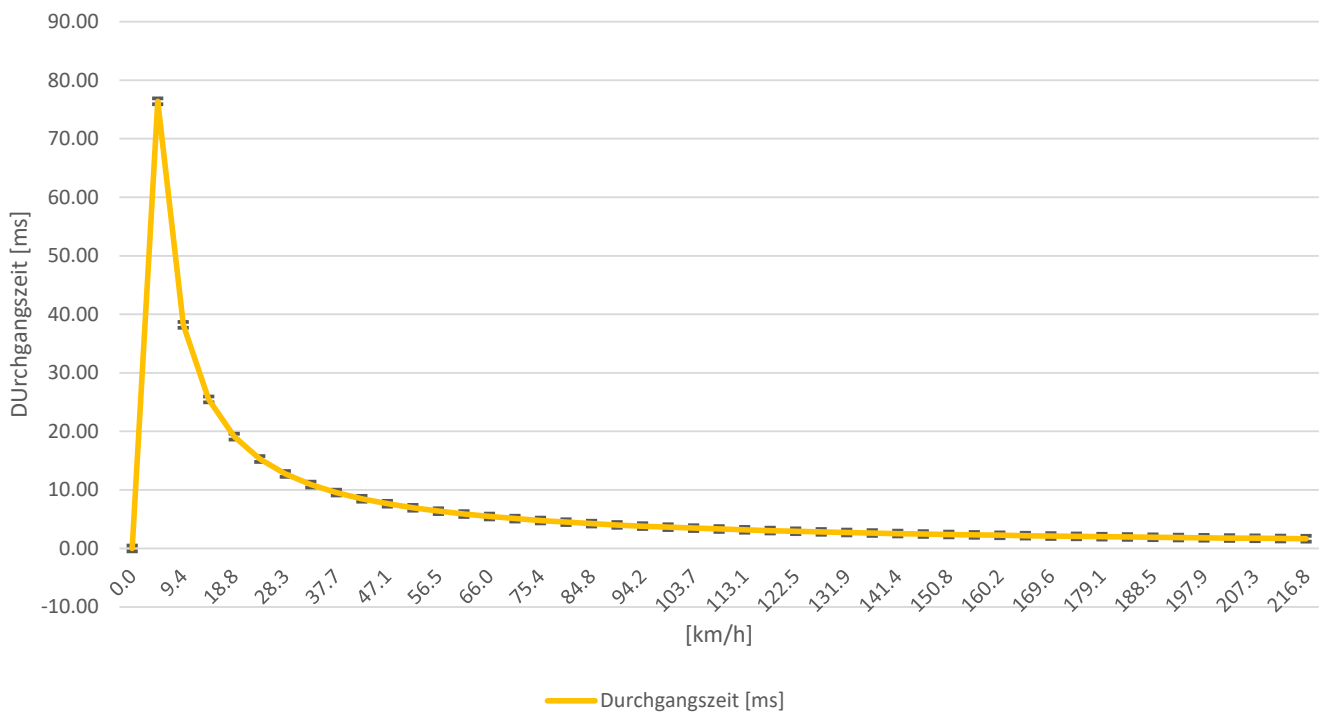
Motor

Luca Mazzoleni

Umfang 1.57 m
Abstand Sens 0.10 m
Fehler Sensor 0.50 ms

| RPM [1/min] | V [m/s] | V[km/h] | Durchgangszeit [ms] | min [m/s] | min [km/h] | max [km/h] | - Fehler km/h | + Fehler km/h |
|-------------|---------|---------|---------------------|-----------|------------|------------|---------------|---------------|
| 0 | 0.0 | 0.0 | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! | #DIV/0! |
| 50 | 1.3 | 4.7 | 76.39 | 1.3 | 4.7 | 4.7 | 0.0 | 0.0 |
| 100 | 2.6 | 9.4 | 38.20 | 2.6 | 9.3 | 9.5 | 0.1 | 0.1 |
| 150 | 3.9 | 14.1 | 25.46 | 3.9 | 13.9 | 14.4 | 0.3 | 0.3 |
| 200 | 5.2 | 18.8 | 19.10 | 5.1 | 18.4 | 19.4 | 0.5 | 0.5 |
| 250 | 6.5 | 23.6 | 15.28 | 6.3 | 22.8 | 24.4 | 0.7 | 0.8 |
| 300 | 7.9 | 28.3 | 12.73 | 7.6 | 27.2 | 29.4 | 1.1 | 1.2 |
| 350 | 9.2 | 33.0 | 10.91 | 8.8 | 31.5 | 34.6 | 1.4 | 1.6 |
| 400 | 10.5 | 37.7 | 9.55 | 10.0 | 35.8 | 39.8 | 1.9 | 2.1 |
| 450 | 11.8 | 42.4 | 8.49 | 11.1 | 40.1 | 45.1 | 2.4 | 2.7 |
| 500 | 13.1 | 47.1 | 7.64 | 12.3 | 44.2 | 50.4 | 2.9 | 3.3 |
| 550 | 14.4 | 51.8 | 6.94 | 13.4 | 48.4 | 55.9 | 3.5 | 4.0 |
| 600 | 15.7 | 56.5 | 6.37 | 14.6 | 52.4 | 61.4 | 4.1 | 4.8 |
| 650 | 17.0 | 61.3 | 5.88 | 15.7 | 56.5 | 67.0 | 4.8 | 5.7 |
| 700 | 18.3 | 66.0 | 5.46 | 16.8 | 60.4 | 72.6 | 5.5 | 6.7 |
| 750 | 19.6 | 70.7 | 5.09 | 17.9 | 64.4 | 78.4 | 6.3 | 7.7 |
| 800 | 20.9 | 75.4 | 4.77 | 19.0 | 68.3 | 84.2 | 7.1 | 8.8 |
| 850 | 22.3 | 80.1 | 4.49 | 20.0 | 72.1 | 90.1 | 8.0 | 10.0 |
| 900 | 23.6 | 84.8 | 4.24 | 21.1 | 75.9 | 96.2 | 8.9 | 11.3 |
| 950 | 24.9 | 89.5 | 4.02 | 22.1 | 79.6 | 102.3 | 9.9 | 12.7 |
| 1000 | 26.2 | 94.2 | 3.82 | 23.1 | 83.3 | 108.4 | 10.9 | 14.2 |
| 1050 | 27.5 | 99.0 | 3.64 | 24.2 | 87.0 | 114.7 | 12.0 | 15.8 |
| 1100 | 28.8 | 103.7 | 3.47 | 25.2 | 90.6 | 121.1 | 13.0 | 17.4 |
| 1150 | 30.1 | 108.4 | 3.32 | 26.2 | 94.2 | 127.6 | 14.2 | 19.2 |
| 1200 | 31.4 | 113.1 | 3.18 | 27.2 | 97.7 | 134.2 | 15.4 | 21.1 |
| 1250 | 32.7 | 117.8 | 3.06 | 28.1 | 101.2 | 140.9 | 16.6 | 23.0 |
| 1300 | 34.0 | 122.5 | 2.94 | 29.1 | 104.7 | 147.6 | 17.8 | 25.1 |
| 1350 | 35.3 | 127.2 | 2.83 | 30.0 | 108.1 | 154.5 | 19.1 | 27.3 |
| 1400 | 36.7 | 131.9 | 2.73 | 31.0 | 111.5 | 161.6 | 20.4 | 29.6 |
| 1450 | 38.0 | 136.7 | 2.63 | 31.9 | 114.9 | 168.7 | 21.8 | 32.0 |
| 1500 | 39.3 | 141.4 | 2.55 | 32.8 | 118.2 | 175.9 | 23.2 | 34.5 |
| 1550 | 40.6 | 146.1 | 2.46 | 33.7 | 121.4 | 183.3 | 24.6 | 37.2 |
| 1600 | 41.9 | 150.8 | 2.39 | 34.6 | 124.7 | 190.7 | 26.1 | 39.9 |
| 1650 | 43.2 | 155.5 | 2.31 | 35.5 | 127.9 | 198.3 | 27.6 | 42.8 |
| 1700 | 44.5 | 160.2 | 2.25 | 36.4 | 131.1 | 206.1 | 29.2 | 45.9 |
| 1750 | 45.8 | 164.9 | 2.18 | 37.3 | 134.2 | 213.9 | 30.7 | 49.0 |
| 1800 | 47.1 | 169.6 | 2.12 | 38.1 | 137.3 | 221.9 | 32.3 | 52.3 |
| 1850 | 48.4 | 174.4 | 2.06 | 39.0 | 140.4 | 230.1 | 34.0 | 55.7 |
| 1900 | 49.7 | 179.1 | 2.01 | 39.8 | 143.4 | 238.4 | 35.7 | 59.3 |
| 1950 | 51.1 | 183.8 | 1.96 | 40.7 | 146.4 | 246.8 | 37.4 | 63.0 |
| 2000 | 52.4 | 188.5 | 1.91 | 41.5 | 149.4 | 255.3 | 39.1 | 66.8 |
| 2050 | 53.7 | 193.2 | 1.86 | 42.3 | 152.3 | 264.1 | 40.9 | 70.9 |
| 2100 | 55.0 | 197.9 | 1.82 | 43.1 | 155.2 | 273.0 | 42.7 | 75.0 |
| 2150 | 56.3 | 202.6 | 1.78 | 43.9 | 158.1 | 282.0 | 44.5 | 79.4 |
| 2200 | 57.6 | 207.3 | 1.74 | 44.7 | 161.0 | 291.2 | 46.4 | 83.9 |
| 2250 | 58.9 | 212.1 | 1.70 | 45.5 | 163.8 | 300.6 | 48.2 | 88.5 |
| 2300 | 60.2 | 216.8 | 1.66 | 46.3 | 166.6 | 310.1 | 50.2 | 93.4 |

Zeitfehler



Max. Geschwindigkeitsfehler

