

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 -> da Stab 2 unterbrüche pro Umdrehungen generiert
33.33 1/sec
Radius 0.250 m
Durchmesser 0.5 m
Umfang 1.57 m 0.785398 Abstand Sensoren 0.79 m
V_umf 52.36 m/s delta_t 0.015708 s
188.50 km/h 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

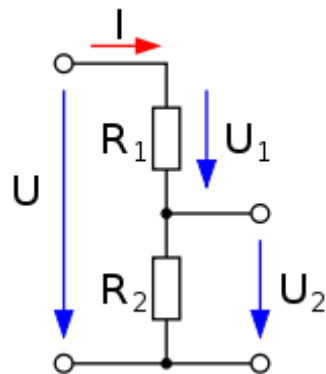
R1 6800

R2 4857.142857 ->

I 0.001029412

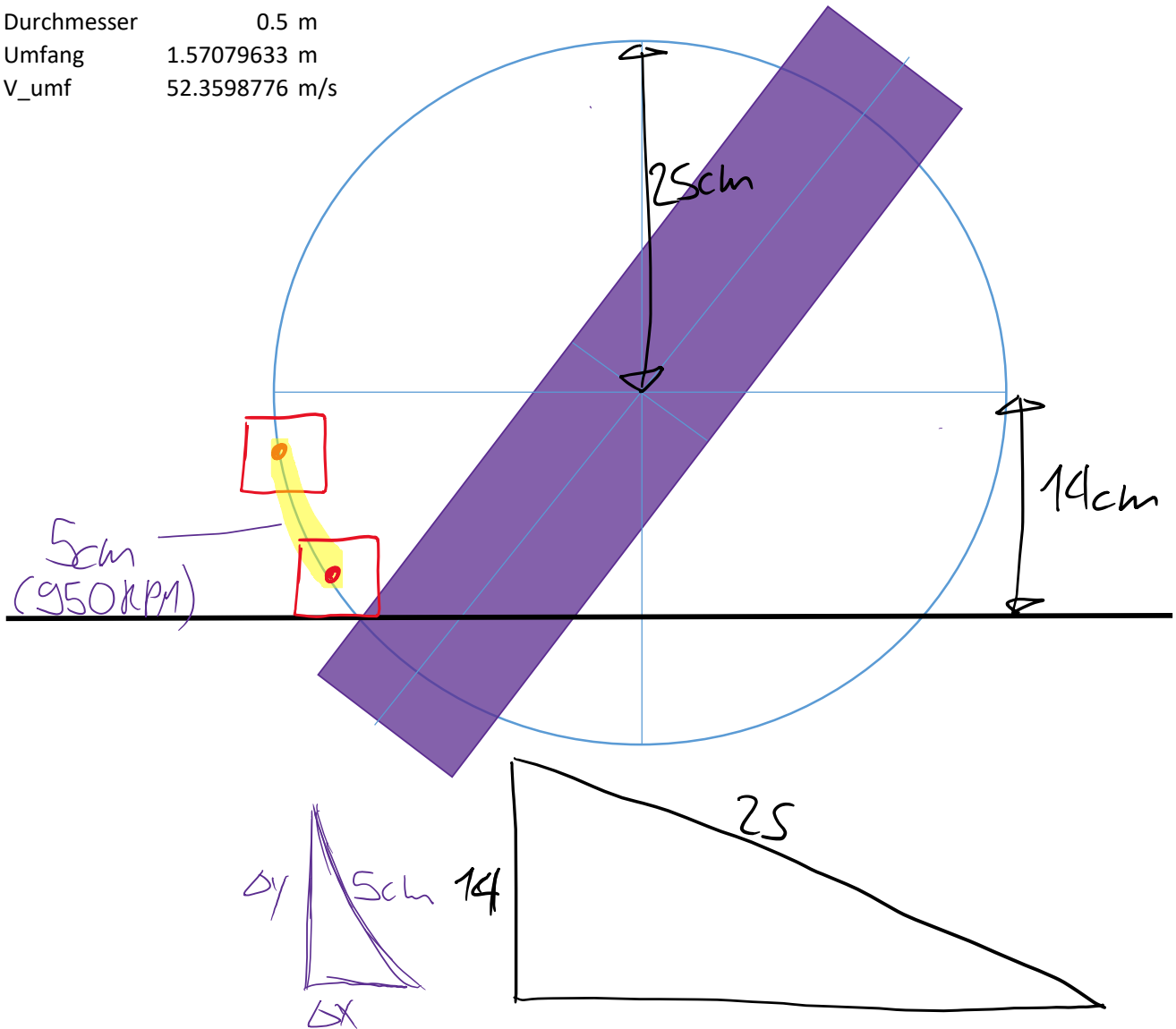
$$U_2 = U / (R_1 + R_2) * R_2$$

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



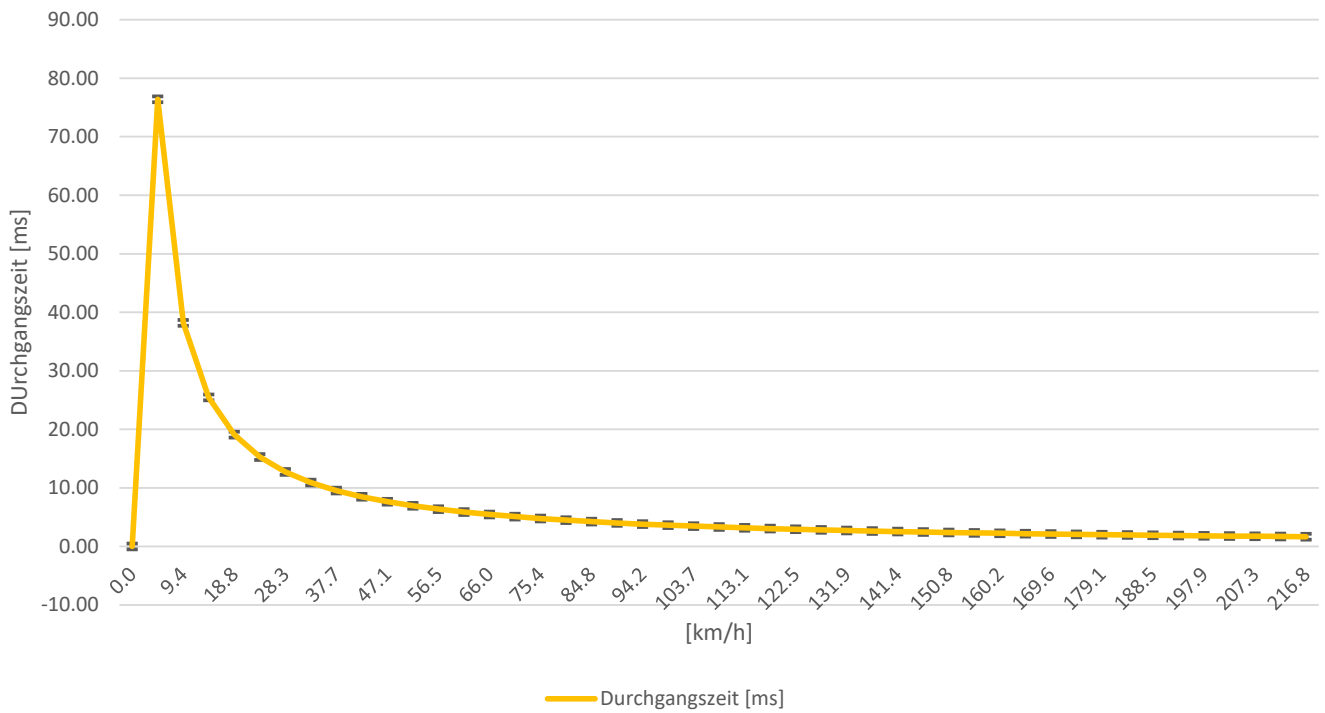
Motor

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

