

TORQUE EQUILIBRIUM – INERTIA WHEEL

MED 03.04



Material:

Item-no.	Qty.	Description
DS101-1G	1	Support base, large, L=500 mm
DS103-7G	1	Sliding saddle, H=70 mm
DS103-3G	1	Sliding saddle, H=34 mm
DS201-75	1	Support rod, round, L=750 mm, D=12 mm
DS400-3K	2	Bosshead cross-pattern, Demo, green
DS204-2L	1	Bearing pin with clamp insert
DM355-1M	1	Inertia wheel
DS500-1H	1	Holder for plates, large
DG101-00	1	Ruler, metal, L=1000 mm
DG110-2G	1	Pointers for ruler, pair
DM725-ND	1	Newtonmeter "inno" 20 N / 2000 g
P3120-5B	1	S-shaped assembly platform

Weights on hooks

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Purpose

Demonstrating the dependence of the torque on the normal distance

Preparation

Place the 70 mm sliding saddle in the left third of the support base;
afterwards insert the support rod into this sliding saddle.

Mount a bosshead on the upper end of the support rod.

Fix the inertia wheel between the clamp insert and its bearing pin and mount the clamp insert at this bosshead.

Two small pins are positioned with the same distance from the centre in a horizontal line on the inertia wheel. Make loops in two pieces of cord (20 cm and 40 cm) and connect them to the pins.

Place another sliding saddle on the support base as shown on the image and insert the weighing bar of the Newtonmeter into this sliding saddle; afterwards place the Newtonmeter on the S-shaped assembly platform for a better visibility.

Experiment 1

The bottom loop of the cord on the right side is connected to the hook of the weighing bar. Loosen the bosshead of the inertia wheel and move it up or down so that the right pin and the bearing pin are horizontally aligned; afterwards fix the bosshead again.

Set the measuring range of the Newtonmeter to „kg“ and turn it on. If required tare it (set to 0).

Weights of various masses are hung on the left cord and the results are read from the display Newtonmeter.

How do the values on the Newton meter relate to the weights attached?



Experiment 2

Place the left pin with the attached cord at other positions along the horizontal line of the bearing pin.

The measured values on the Newtonmeter are related to the attached mass and the distances.

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Experiment 3

Remove the sliding saddle with the attached weighing bar.
Place the two pins with the attached cords with the same distance from the centre in a horizontal line. Afterwards two weights on hook with equal mass are hung to the pins. What happens?

The two weights are in equilibrium.

Experiment 4

Fix a second bosshead on the support rod below the inertia wheel. Mount the holder for plates at this bosshead. Insert the metal ruler into this holder. The pointers are clamped onto the scale in the same direction as the direction of the threads. Thus the associated normal distance can be easily read.

The state of equilibrium does not change.



Experiment 5

Move the pins to demonstrate that the normal distance is always decisive.

Note

With the Newtonmeter (or also Torsion dynamometer) the changed torque can be determined from the horizontal when twisted (one-sided load).