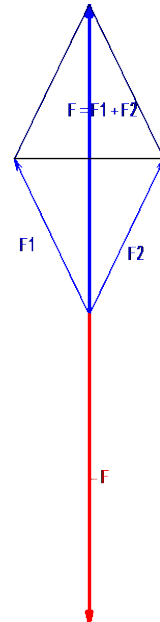


COMPOSITION OF NON-PARALLEL FORCES

MED 02.09



Material:

Item-no.	Qty.	Description
DS101-1G	1	Support base, large, L=500 mm
DS093-04	2	Sliding saddle "Sepp", H=40 mm
DS504-2K	1	Sliding saddle, height adjustable
DS300-75	2	Support rod, squared, L=750 mm, 12x12 mm
DS300-50	1	Support rod, squared, L=500 mm, 12x12 mm
P7240-1G	1	Support rod, round, L=500 mm, D=10 mm
DS400-3K	3	Bosshead cross-pattern, Demo, green
DM355-5A	1	Force table
P1130-2R	1	Ring for force table
DG200-1S	1	Cord, white, D=1.7 mm, L=5 m
DM725-ND	2	Newtonmeter "inno" 20 N / 2000 g
P3120-5B	2	S-shaped assembly platform

Weights on hooks

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Purpose

The force parallelogram is used to combine two forces that act at an angle.

Preparation

One of the two „sepp“ sliding saddles is placed in the centre of the support base, the other one is placed 10 cm to the right of it. Insert the two squared support rods into these sliding saddles.

The height-adjustable sliding saddle is placed 10 cm left of the central sliding saddle; insert the round support rod into this sliding saddle.

Fix the cross-patterned bosshead at a height of 30 cm to the support rod of the sliding saddle in the middle; afterwards the force table can be mounted in this bosshead.



Fix the other two bosshead on top of the two outer support rods and mount the weighing bars of the Newtonmeter in those bossheads as shown on the image to the right. The hooks of the weighing bars are initially pushed towards each other so that they are placed in parallel one behind the other.

Three pieces of cord of various lengths (between 20 and 25 cm) are connected to the ring for force table. Two of the cords are then hung into the hooks of the weighing bars. Now the weighing bars are moved until the ring is hanging in the centre of the force table.

Set the measuring range on both Newtonmeter to „N“ (Newton), afterwards turn them on and tare (set to 0).

Experiment 1

Hang weights with a total of 200g on the hanging cord.

Which forces shown on the Newtonmeter counteract the tensile force of 1.96N (200g)?

Experiment 2

Loosen the bossheads with the weighing bars and pull them slowly apart.

Note the forces on the Newtonmeter for every 10 ° and note them in a chart.

Result

The resultant force (diagonal in the parallelogram of forces) counteracts the force of 1.96N (200g weights on hook); the forces F_1 and F_2 that still act at an angle must be greater than two forces that are directed exactly upwards (f is halved).