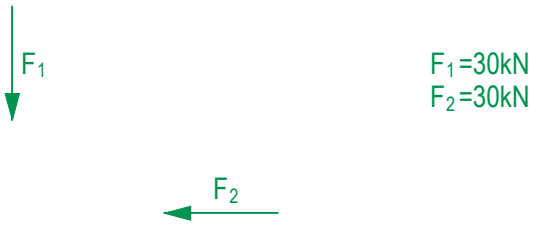
1.1

Resultant of two non-parallel Forces

Two non-parallel forces F_1 and F_2 are given. The magnitude of the resultant and its position in the form diagram is to be found.

The resultant is the vector addition of all forces acting on the system. In graphic statics, the properties of the vectors (forces) are shown graphically in two different drawings. In the form diagram the position and the direction of the acting forces as well as the geometry of the structure are shown in a reduced scale. In the force diagram, however, the direction and magnitude of the forces are shown.



The two acting forces are drawn one after the other (clockwise) in the force diagram. The direction of the forces is maintained, their length in the force diagram corresponds to the magnitude of the force. This length is determined by the scale of the force diagram, where one centimetre [cm] corresponds to a certain number of kilo newtons [kN]. With the given scale, the vector of force F_1 in the force diagram is 3 cm long. F_2 begins at the end of F_1, also with a length of 3 cm. Together they form the so-called load line, i.e. the sum of all acting forces. The connection between the beginning of the first force and the end of the last force of the load line corresponds to the resultant R. The force diagram indicates the direction and the magnitude of the resultant.

To find the position of the resultant in the form diagram, the lines of action of the attacking forces are drawn. The line of action of the resultant runs through their point of intersection. The direction of the resultant can now be moved parallel from the force diagram to the intersection point found in the form diagram. The position of R on the line of action, as well as the length of the vector, is freely selectable, since only the position and direction of the force, but not its magnitude, is shown graphically in the form diagram.

form diagrams 1:100

force diagrams 1cm ≙ 10kN