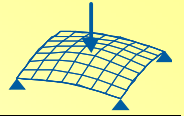
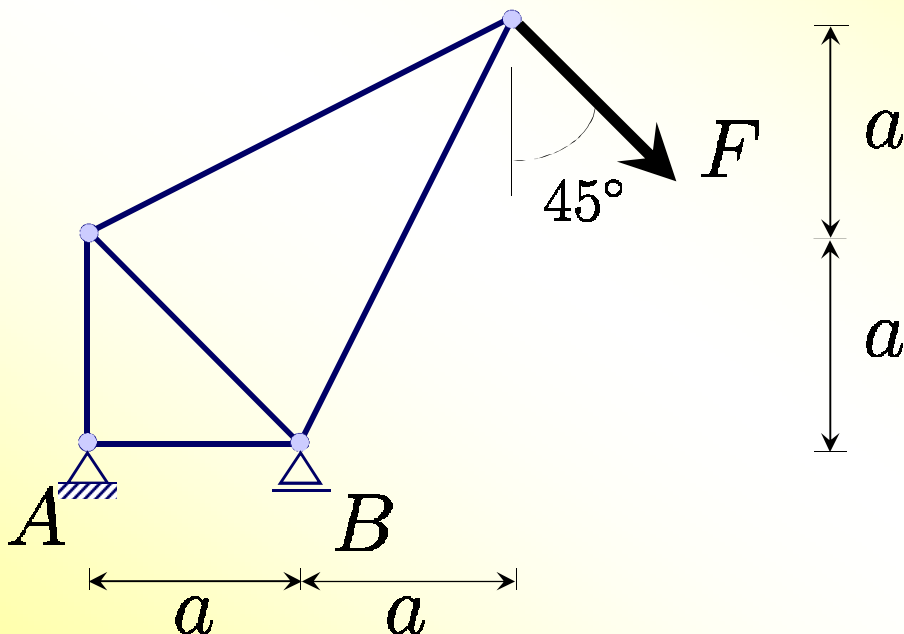


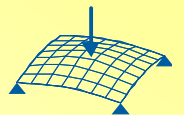
Aufgabe 1: Cremona-Plan



Bestimmen Sie an dem dargestellten Fachwerk den Grad der statischen Unbestimmtheit, alle Auflagerreaktionen und zeichnerisch alle Stabkräfte mit Hilfe eines Cremona-Plans.



Aufgabe 1: Cremona-Plan



a.) Grad der statischen Unbestimmtheit

$$a = r + s - 2 \cdot k$$

a – Grad der statischen Unbestimmtheit,

r – Anzahl der Auflagereaktionen,

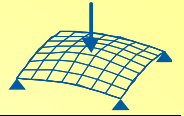
s – Anzahl der Stäbe,

k – Anzahl der Knoten

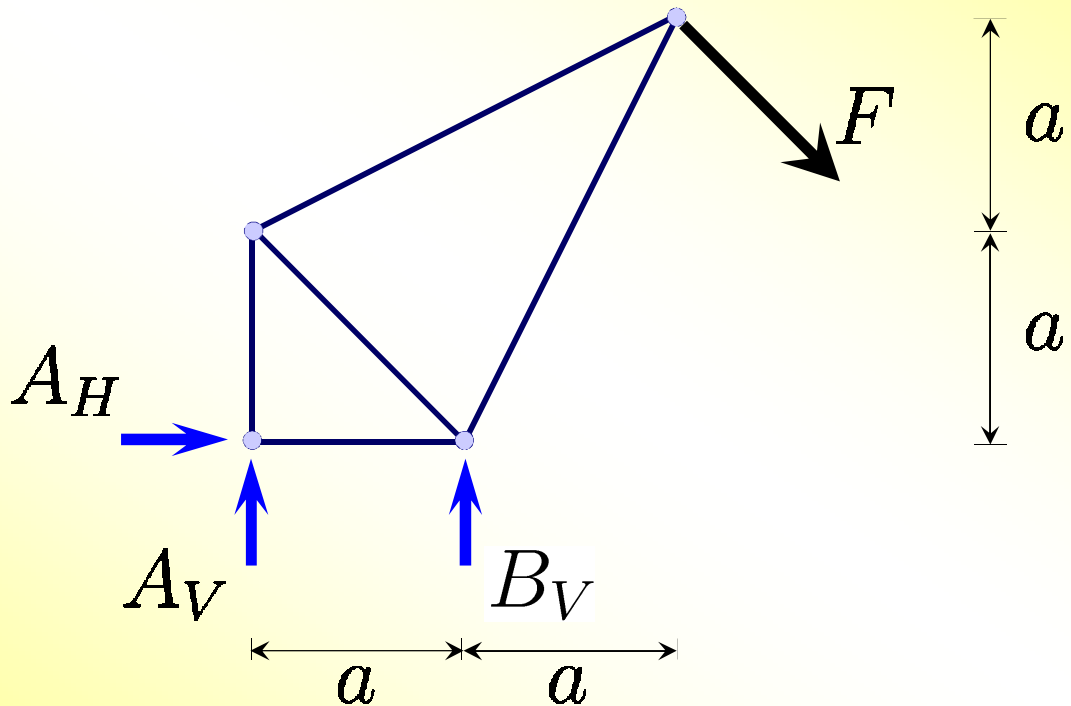
$$a = (2 + 1) + 5 - 2 \cdot 4 = 0$$

⇒ statisch bestimmt

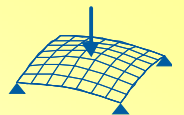
Aufgabe 1: Cremona-Plan



b.) Auflagerreaktionen



Aufgabe 1: Cremona-Plan



b) Auflagerreaktionen

$$\rightarrow: \quad A_H + F \sin 45^\circ = 0$$

$$\hat{A}: \quad B_V \cdot a - F \cos 45^\circ \cdot 2a - F \sin 45^\circ \cdot 2a = 0$$

$$\uparrow: \quad A_V + B_V - F \cos 45^\circ = 0$$

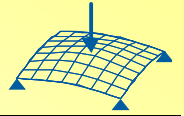
Aus der Gleichgewichtsbedingungen erhalten wir

$$A_H = -\frac{\sqrt{2}}{2}F$$

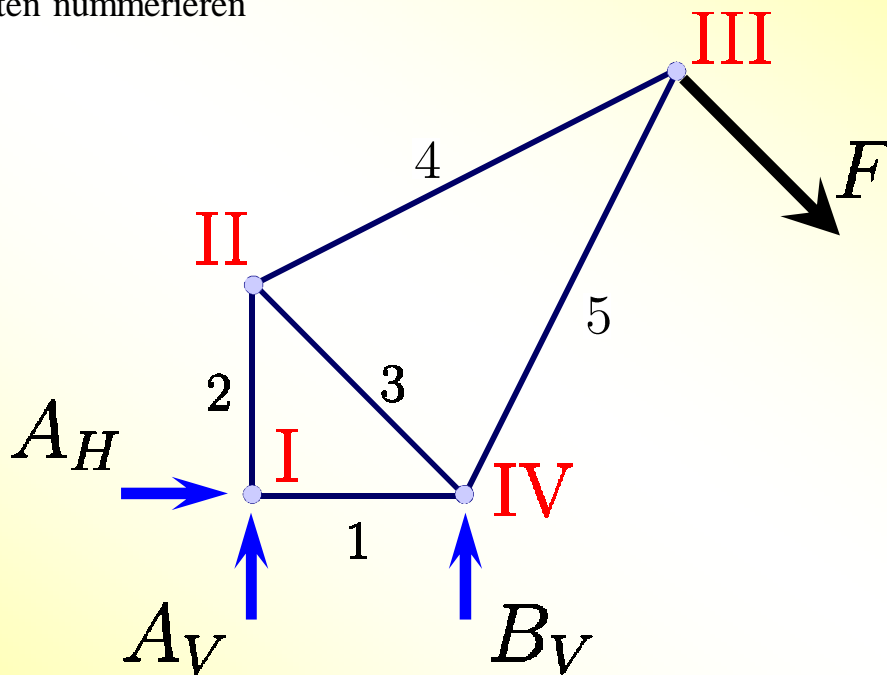
$$A_V = -\frac{3\sqrt{2}}{2}F$$

$$B_V = 2\sqrt{2}F$$

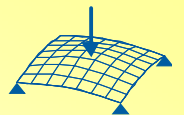
Aufgabe 1: Cremona-Plan



Stäbe und Knoten nummerieren

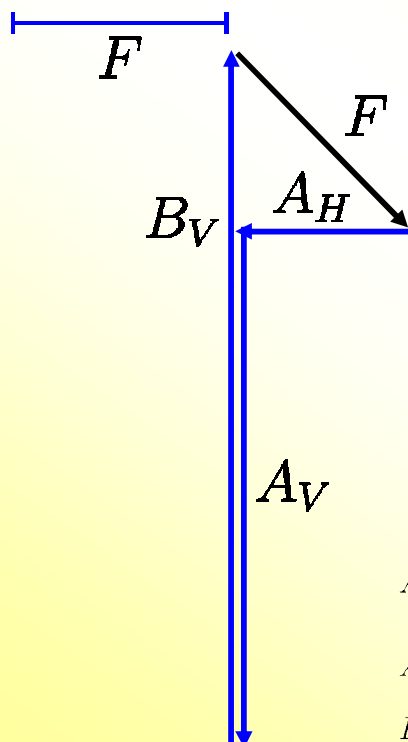


Aufgabe 1: Cremona-Plan



Kräftemaßstab

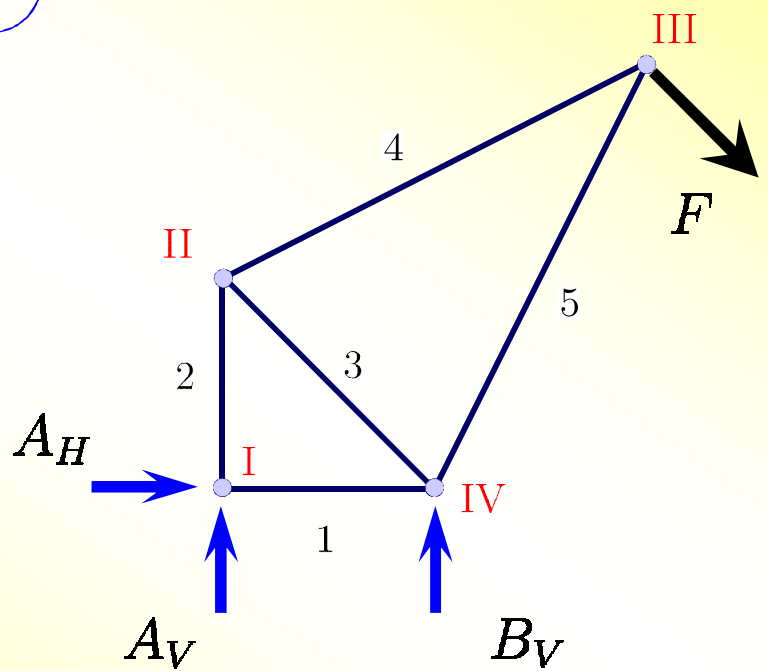
Umlaufsinn



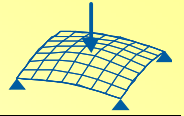
$$A_H = -\frac{\sqrt{2}}{2}F$$

$$A_V = -\frac{3\sqrt{2}}{2}F$$

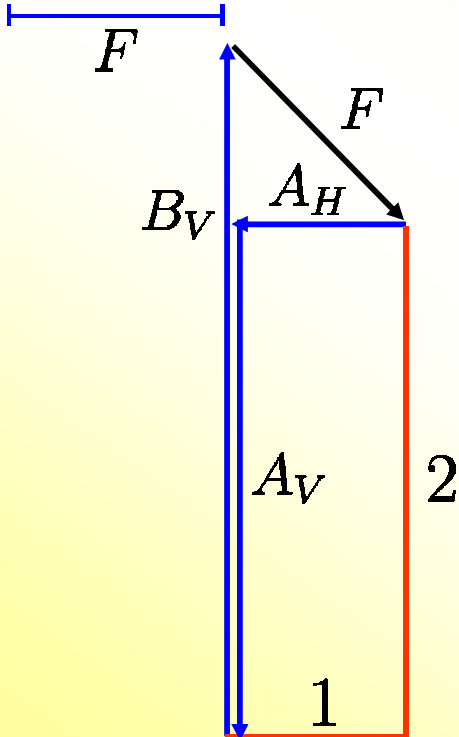
$$B_V = 2\sqrt{2}F$$



Aufgabe 1: Cremona-Plan



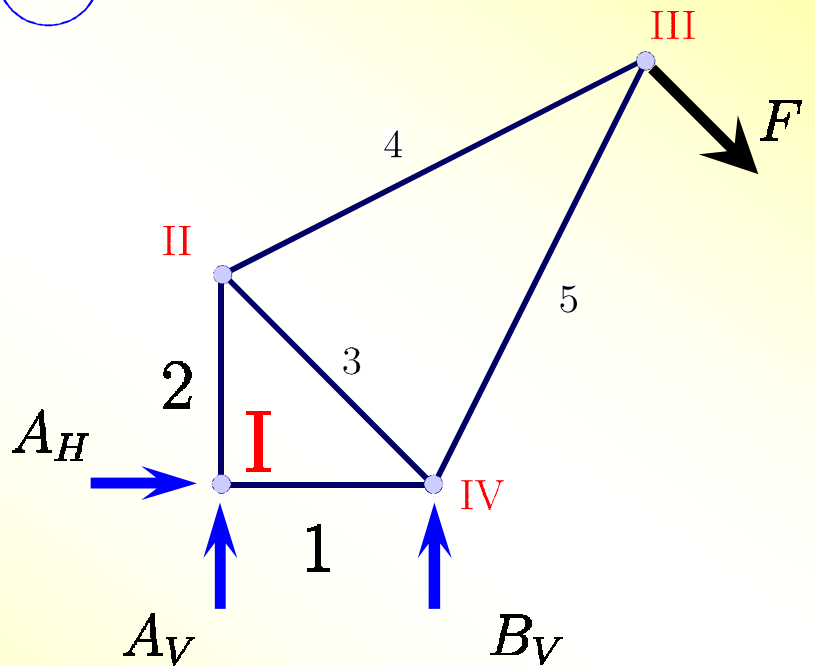
Kräftemaßstab



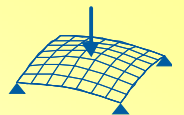
Umlaufsinn



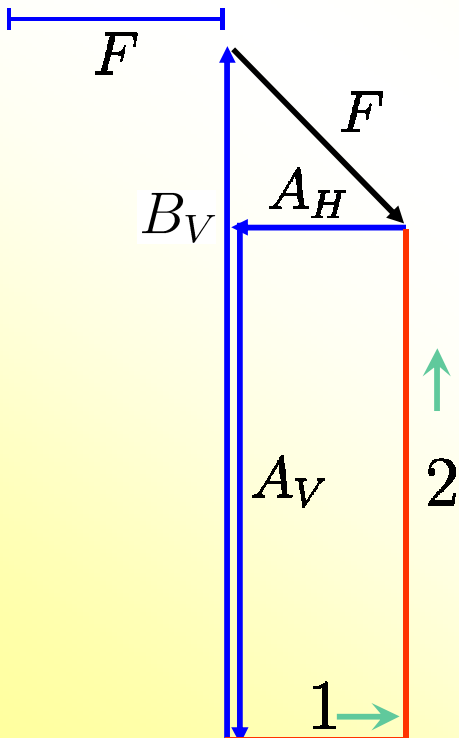
Knoten I



Aufgabe 1: Cremona-Plan



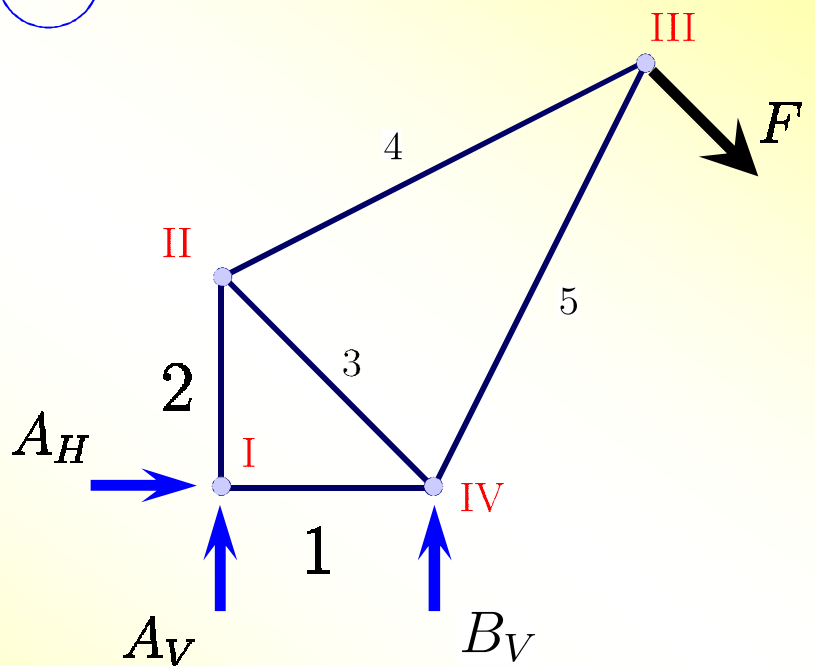
Kräftemaßstab



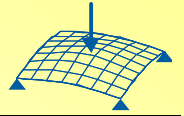
Umlaufsinn



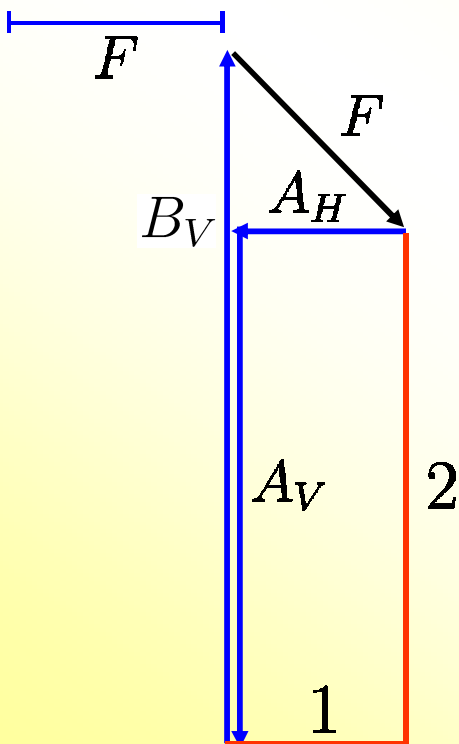
Knoten I



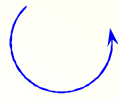
Aufgabe 1: Cremona-Plan



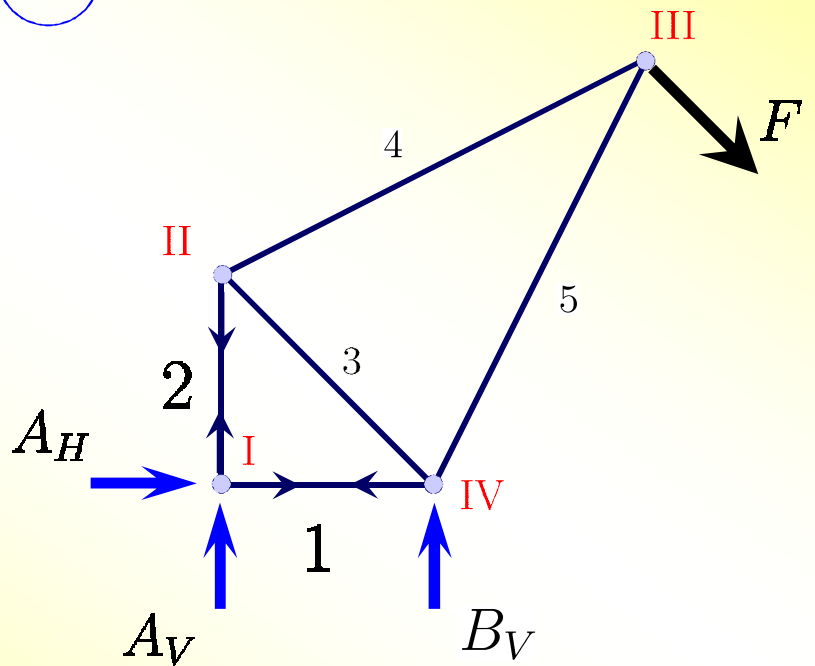
Kräftemaßstab



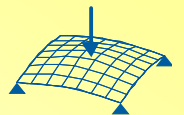
Umlaufsinn



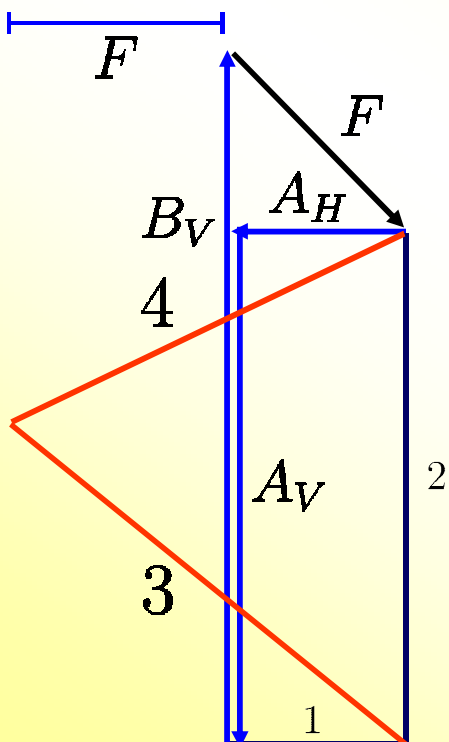
Knoten I



Aufgabe 1: Cremona-Plan



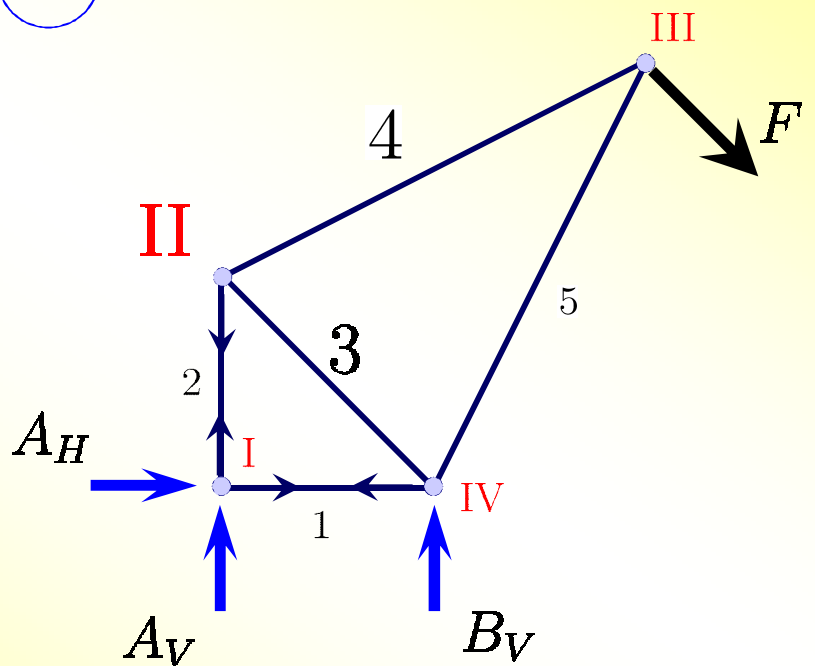
Kräftemaßstab



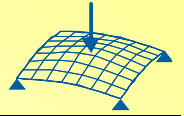
Umlaufsinn



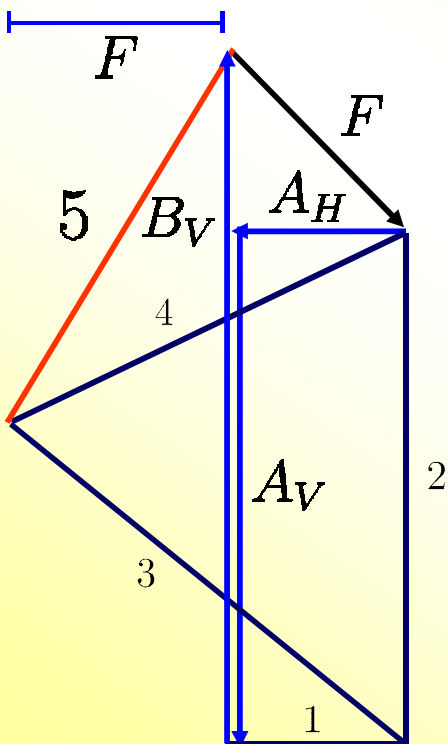
Knoten II



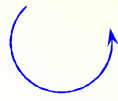
Aufgabe 1: Cremona-Plan



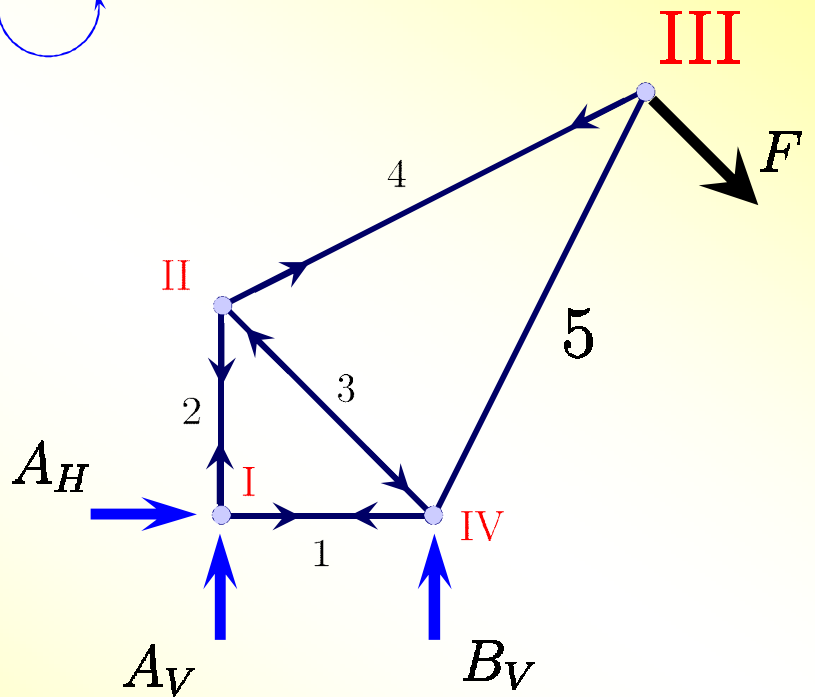
Kräftemaßstab



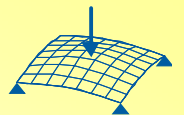
Umlaufsinn



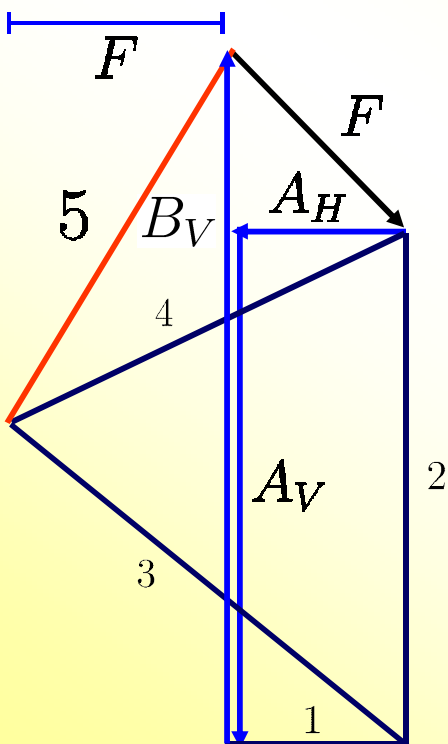
Knoten III



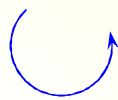
Aufgabe 1: Cremona-Plan



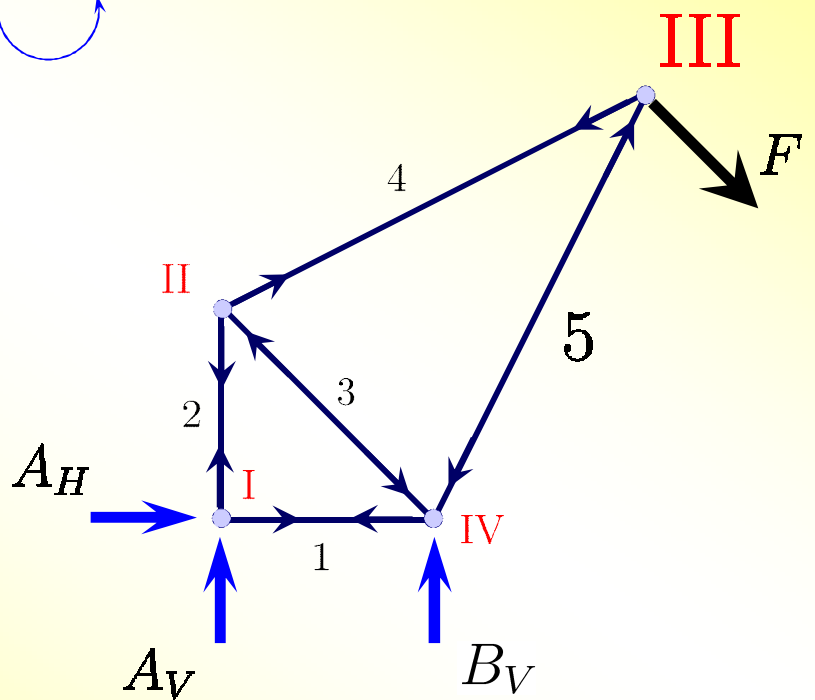
Kräftemaßstab



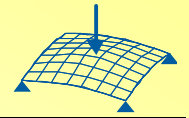
Umlaufsinn



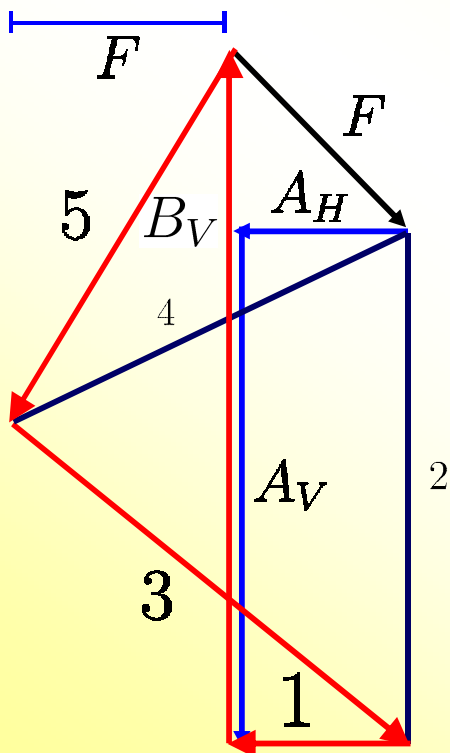
Knoten III



Aufgabe 1: Cremona-Plan



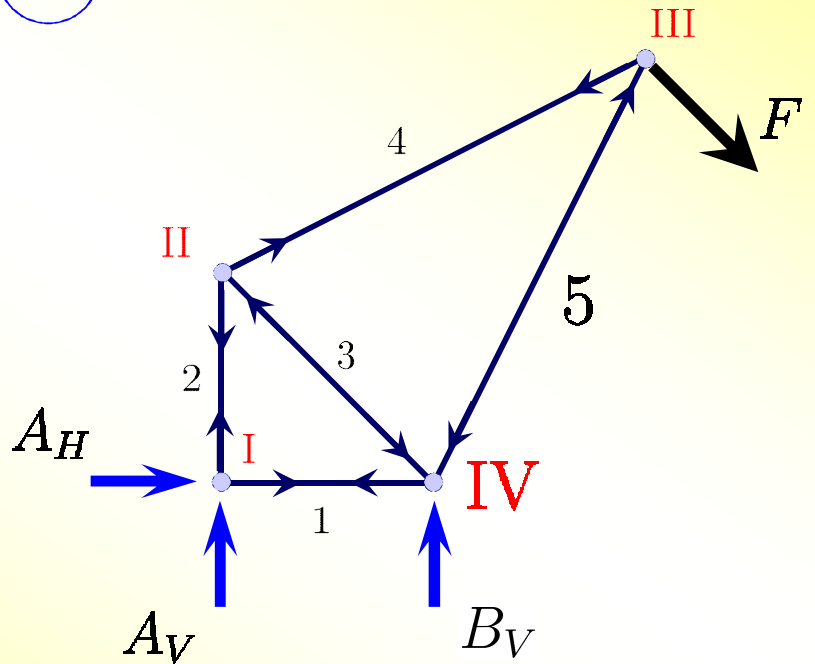
Kräftemaßstab



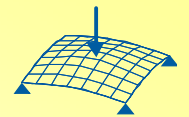
Umlaufsinn



Knoten IV
Kontrolle III



Aufgabe 1: Cremona-Plan



Stabkrafttabelle

Stab	1	2	3	4	5
Stabkraft	0.7 F	2.1 F	-2 F	1,6 F	-1,6 F