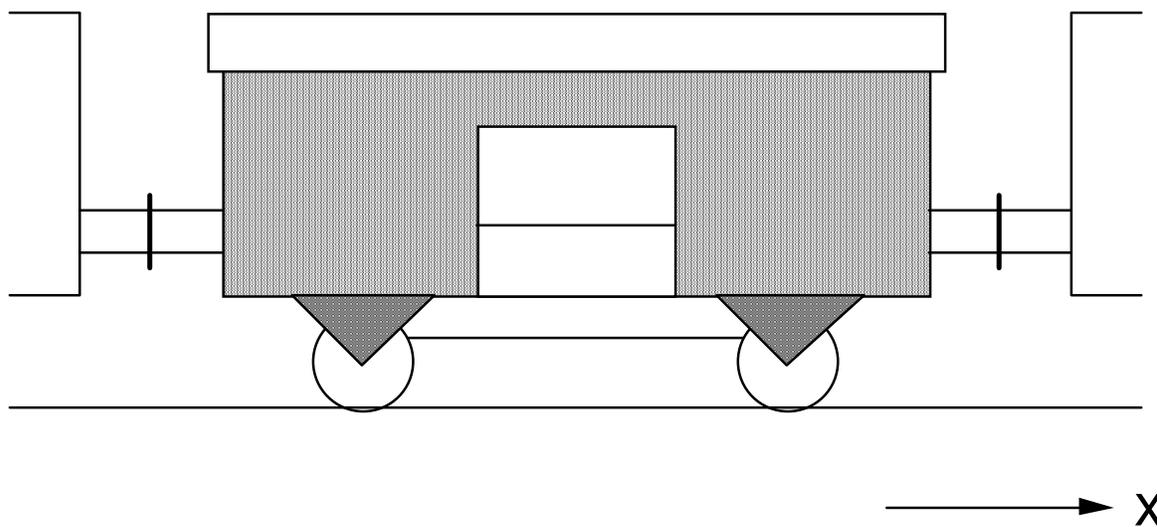


# Impuls

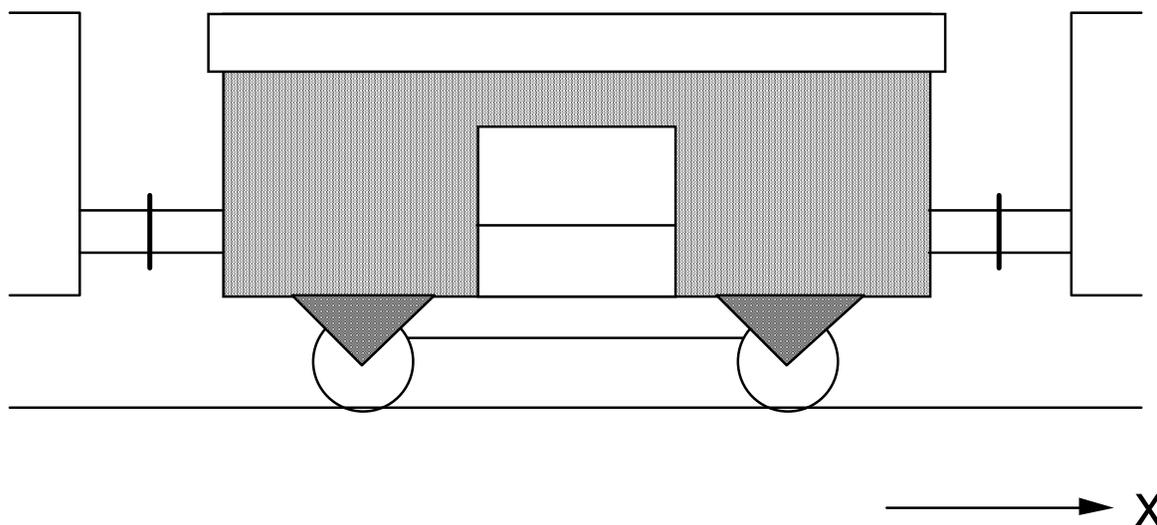
- Schwung, Bewegungsmenge, Impuls
- Voraussetzung für Bewegung
  - Bewegte Körper enthalten Impuls, ruhende nicht.
- Grundgrösse der Translations-Mechanik
- Mengenartige Grösse
  - "unsichtbare Flüssigkeit"  
Speichern, Fliesen
- Erhaltungsgrösse
  - weder Erzeugung noch Vernichtung
- $p = m \cdot v$        $[p] = \text{kg} \cdot \frac{\text{m}}{\text{s}} = \text{Hy (Huygens)}$

# Impulsstrom $\leftrightarrow$ Kraft

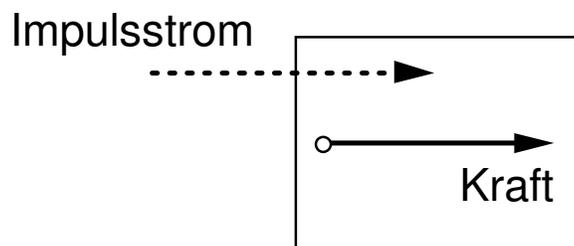
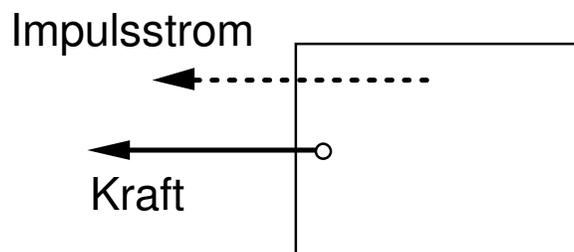
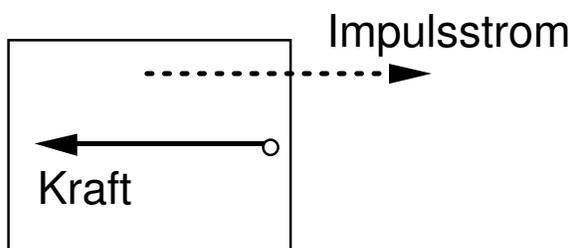
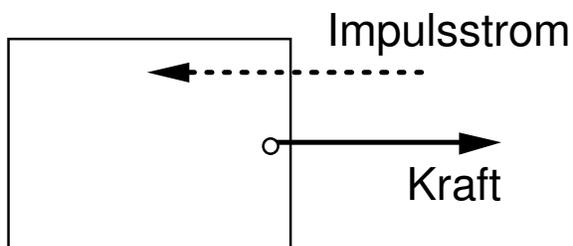
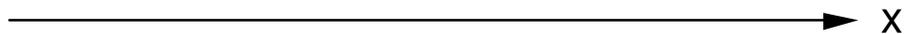
## Impulsströme



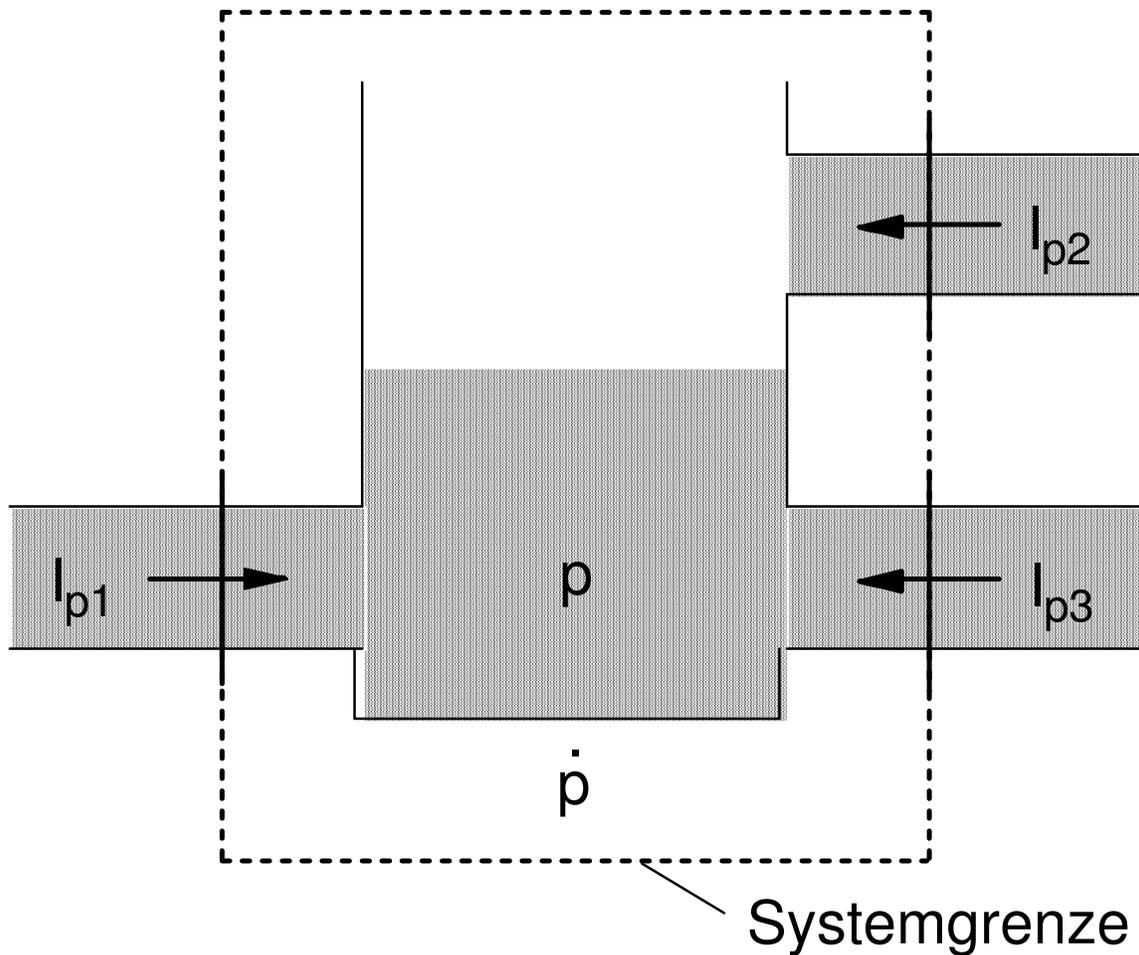
## Kräfte



# Impulsstrom $\leftrightarrow$ Kraft



# Impulsbilanz



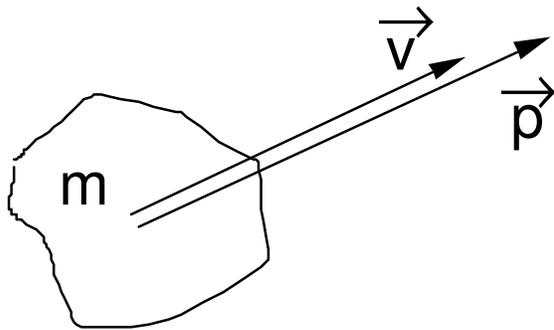
## Impulsbilanz

$$I_{p1} + I_{p2} + I_{p3} = \dot{p}$$

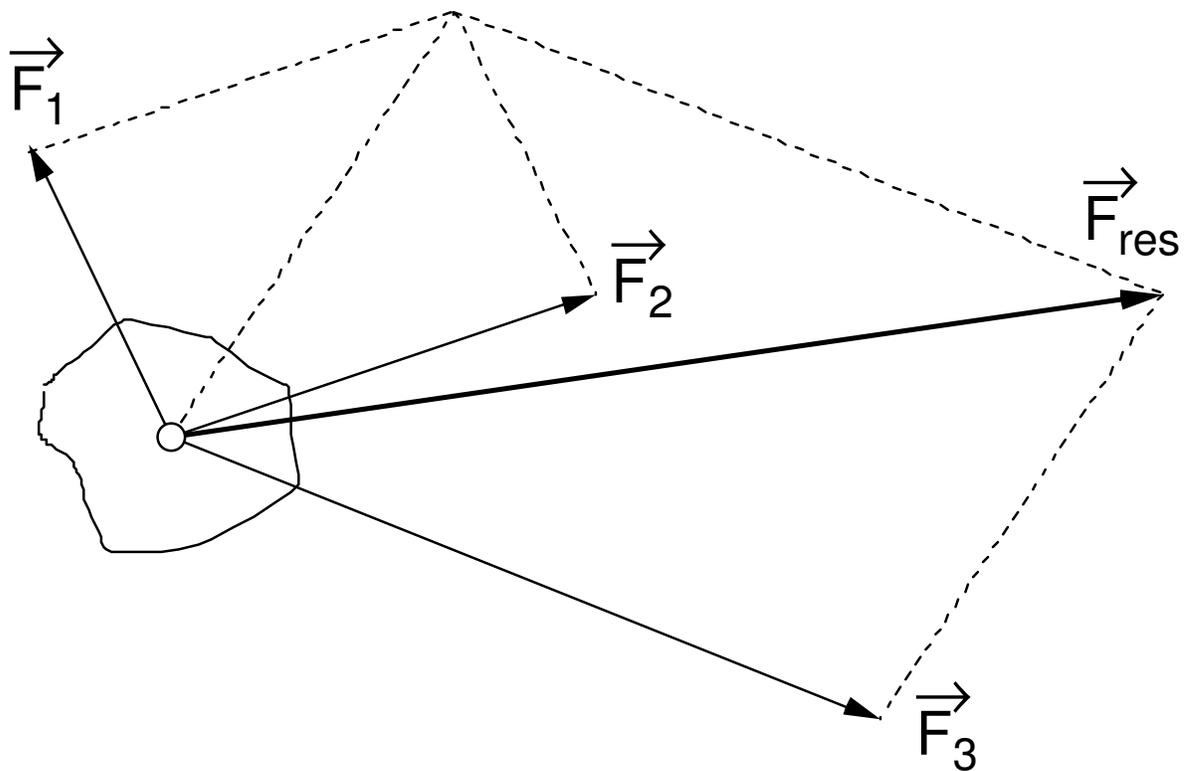
## Impulsbilanz / Grundgesetz der Mechanik

$$I_{p1} + I_{p2} + \dots = F_1 + F_2 + \dots = \dot{p} = m \cdot \dot{v}$$

# Vektorcharakter von Impuls und Kraft



$$\vec{p} = m \cdot \vec{v}$$

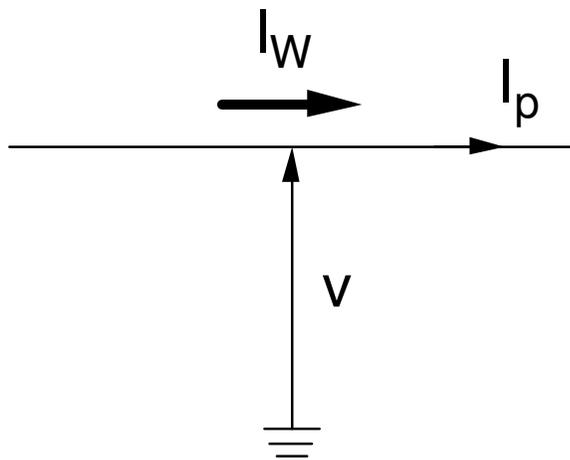


Grundgesetz der Mechanik

$$\vec{F}_1 + \vec{F}_2 + \dots = \vec{F}_{res} = \dot{\vec{p}} = m \cdot \dot{\vec{v}}$$

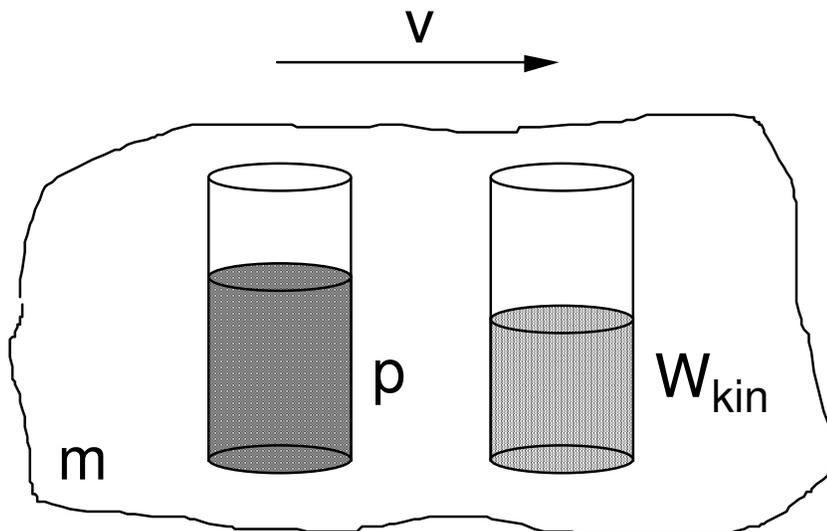
# Impuls als Energieträger

## Energietransport



$$I_W = v \cdot I_p$$

## Energiespeicherung



"Kinetische Energie"  $W_{kin} = \frac{v}{2} \cdot p = \frac{1}{2} mv^2$