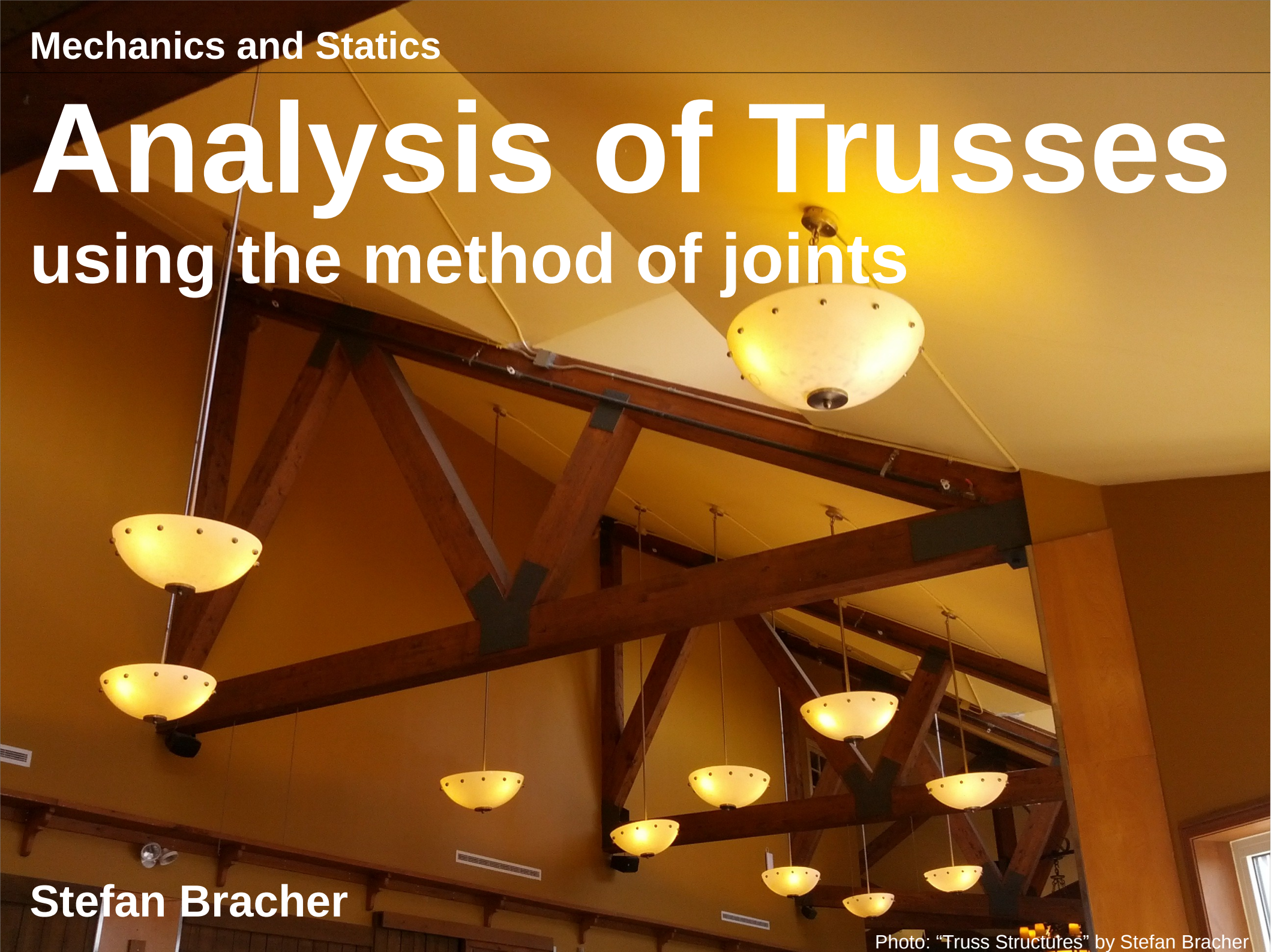


Mechanics and Statics

# Analysis of Trusses

using the method of joints



Stefan Bracher

Photo: "Truss Structures" by Stefan Bracher



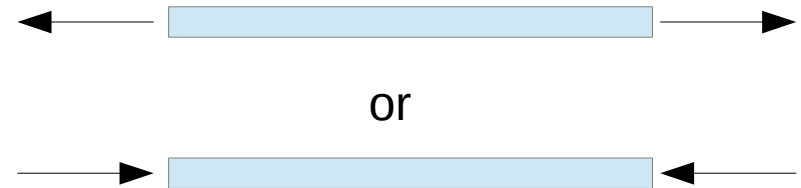
# Truss

- Stationary structure made of straight members connected by joints
- Members can only hold forces along the member
  - Two forces per member only, no lateral forces or bending moments
  - All load must be applied to joints

( Note: If a member is holding three or more forces, the structure is considered a frame, not a truss )



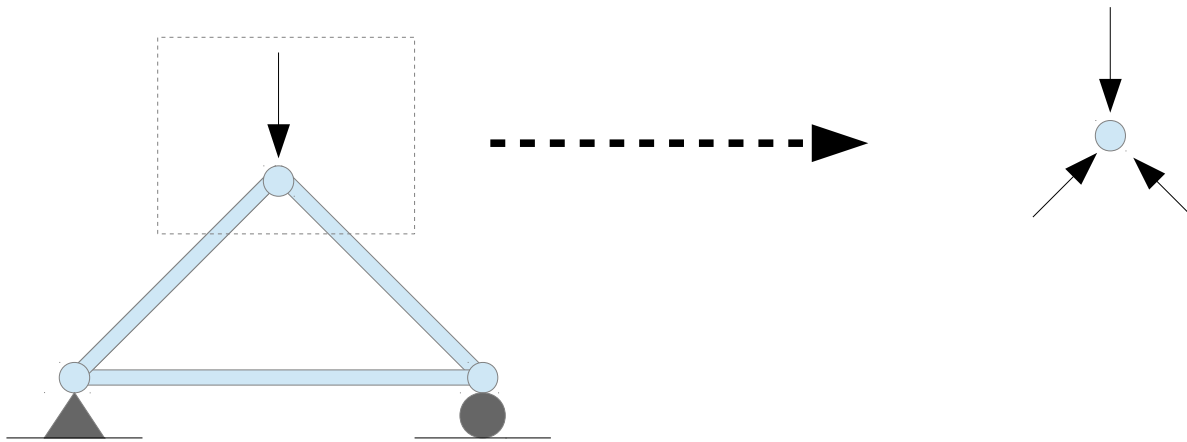
Photo: "Truss Bridge in Vancouver" by Stefan Bracher



# Joints

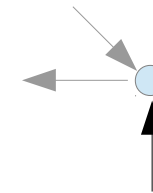
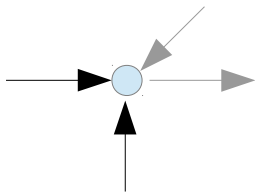
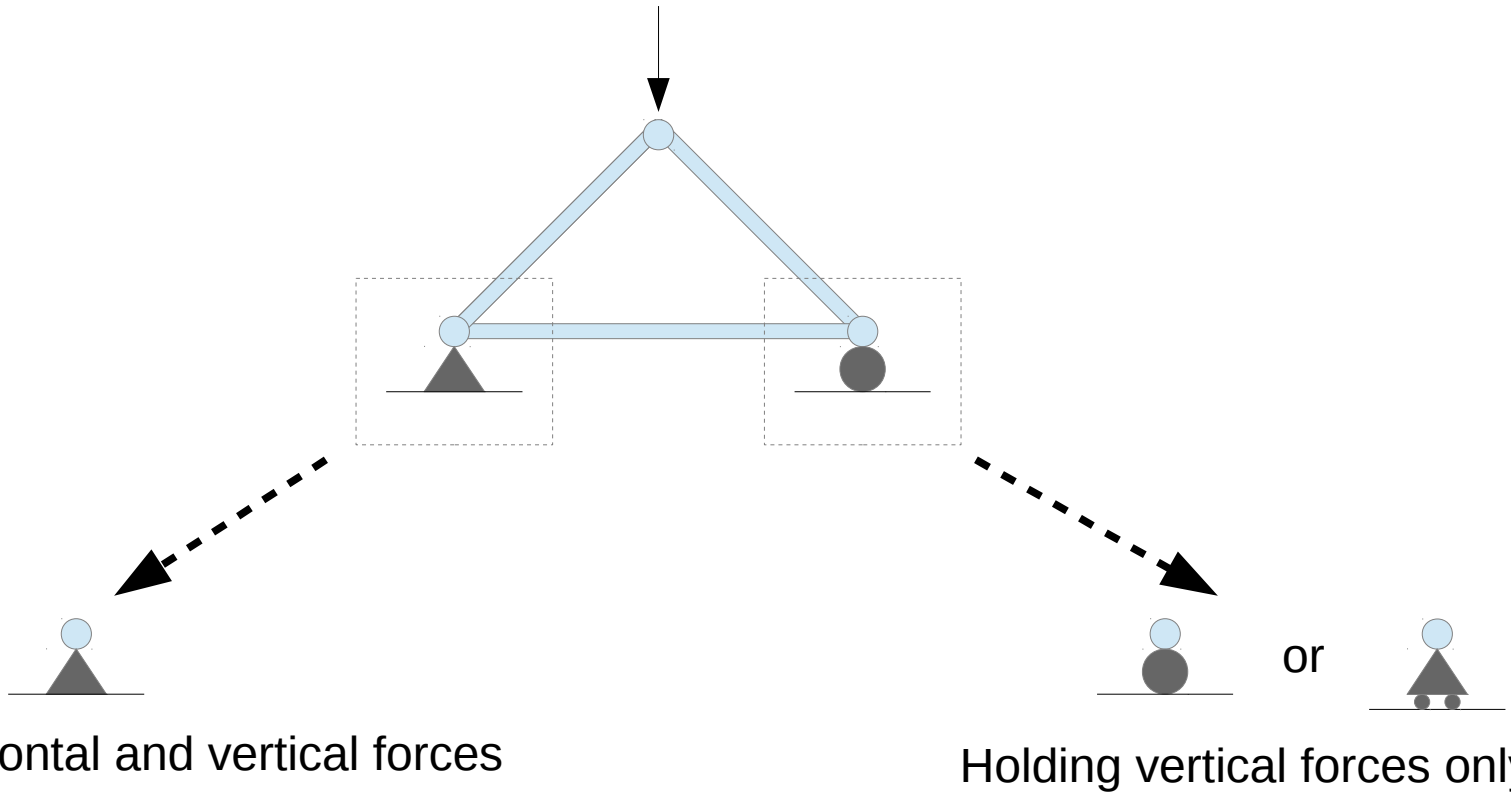
- Joints connect the members of a truss
- One single force from each member ( $\rightarrow$  no couples)
- Joints can support additional linear loads (no couples)

(If the members are not considered weightless, apply half of the weight to each joint connecting to the member)



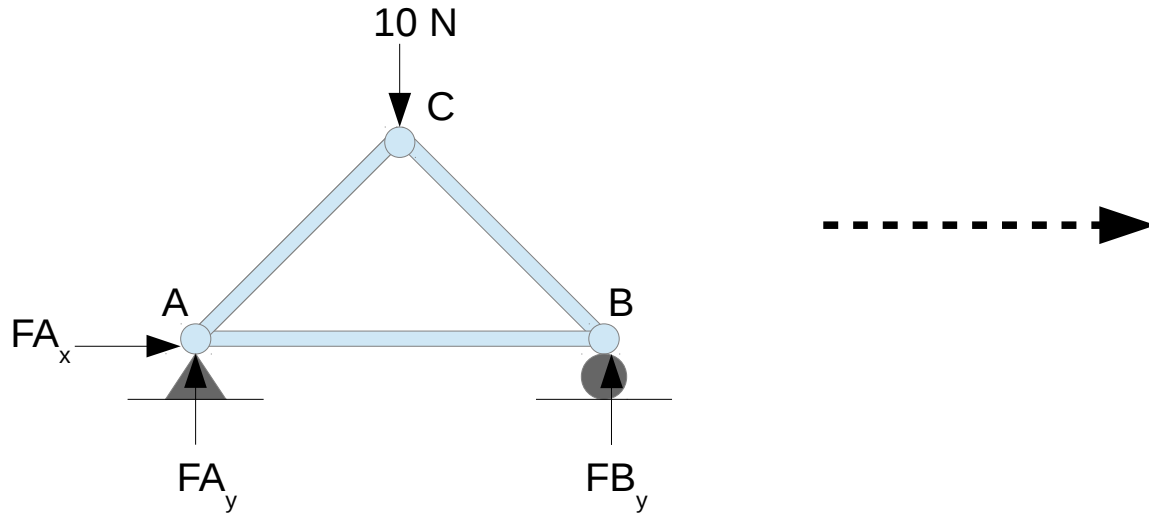
# Supports

- Joints that connect the structure to the environment



# Method of joints

1. Draw the FBD of the complete structure, considering only external forces



(to be completed in class)

2. Use the static equilibrium to identify the forces at the supports



# Units and formulas

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Si-Unit

Newton

[N]

American

Kilo-Pound  
(1000 pounds)

[kip] or [kips]

$$1 \text{ kip} = 4448.2216 \text{ N}$$

For physics formulas, we usually convert to SI-Units first, however, for the translational equilibrium, you can also use American units.

→ conversion not necessary