Introduction
Steel truss structures are a commonly used solution when constructing industrial buildings, more specifically to support the roof. When designing any kind of structure, one always strives to achieve the most economical solution, both for the client and the contractor. One of the main factors of the total cost of a project is the material cost, and in steel construction this cost depends largely on the weight of the structure. In association with the stability bureau AB Associations, the objective of this thesis is the weight optimization of steel trusses, used in industrial portal steel frames, by means of computer aided structural design software.

Optimization procedure
- Objective function
  - Minimize $W(A_i) = \sum_{i=1}^{n} A_i L_i y$
- Variables
  - Shape optimization
    - Length: 25m - 35m
    - Height $H_0$: 1.25m - 2.00m
  - Size optimization
    - Cross-sections
      - Columns: IPE
      - Chords: HEA
      - Web members: SHS (80/4, 60/4, 100/5)
- Constraints
  - Geometry: Frame spacing 6m
  - Loads
    - Wind: 0.591 kN/m²
    - Snow: 0.4 kN/m²
    - Roof: 0.25 kN/m²
    - Self-weight: 77 kN/m³
  - Limit states
    - SLS: deflection, lateral displacement
    - ULS: cross-sectional resistance, buckling

Optimization results