



Structural Analysis & Design Software

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Dr. Ing. Jonas Bien
Organizer

Product Engineering & Customer Support
Dlubal Software GmbH



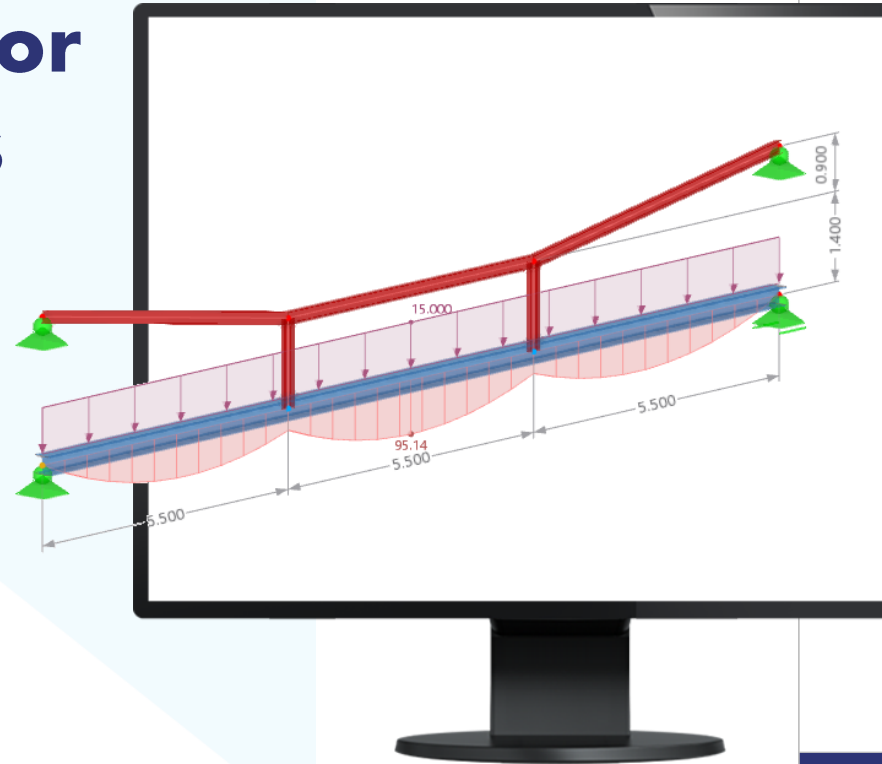
Dipl.-Ing. (FH) Richard Haase
Co-Organizer

Product Engineering & Customer Support
Dlubal Software GmbH



PART 1 | Introduction to Member Design

RFEM 6 for Students



Questions during the presentation



GoToWebinar Control Panel
Desktop



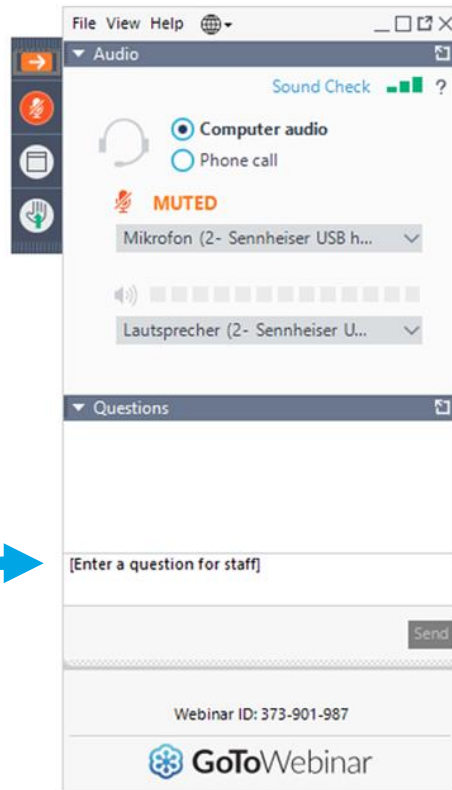
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Show or hide control panel



Ask questions

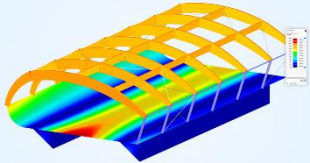


Adjust audio settings



EVENT SCHEDULE

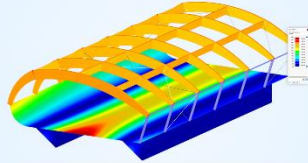
Online Training | English



Thu, Oct 26, 2023 | 4:00 PM - 7:00 PM CEST

**RFEM 6 | Students
Member Design**

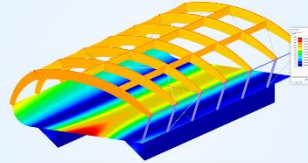
Online Training | English



Tue, Oct 31, 2023 | 4:00 PM - 5:00 PM CEST

**RSECTION | Students
Strength of Materials**

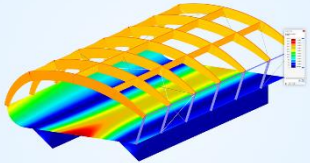
Online Training | English



Wed, Nov 08, 2023 | 4:00 PM - 5:00 PM CET

**RFEM 6 | Students
Introduction to FEM**

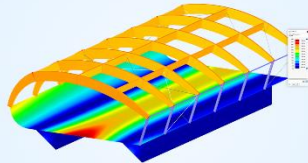
Online Training | English



Wed, Nov 15, 2023 | 4:00 PM - 5:00 PM CET

**RFEM 6 | Students
Steel Design**

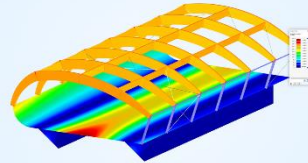
Online Training | English



Thu, Nov 23, 2023 | 4:00 PM - 5:00 PM CET

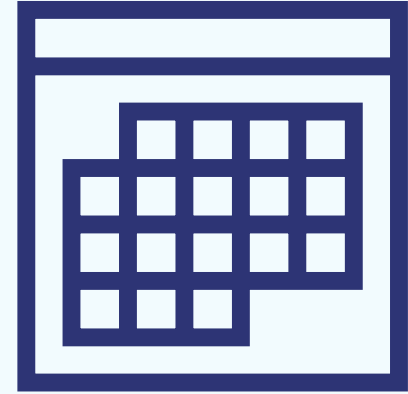
**RFEM 6 | Students
Reinf Concrete Design**

Online Training | English



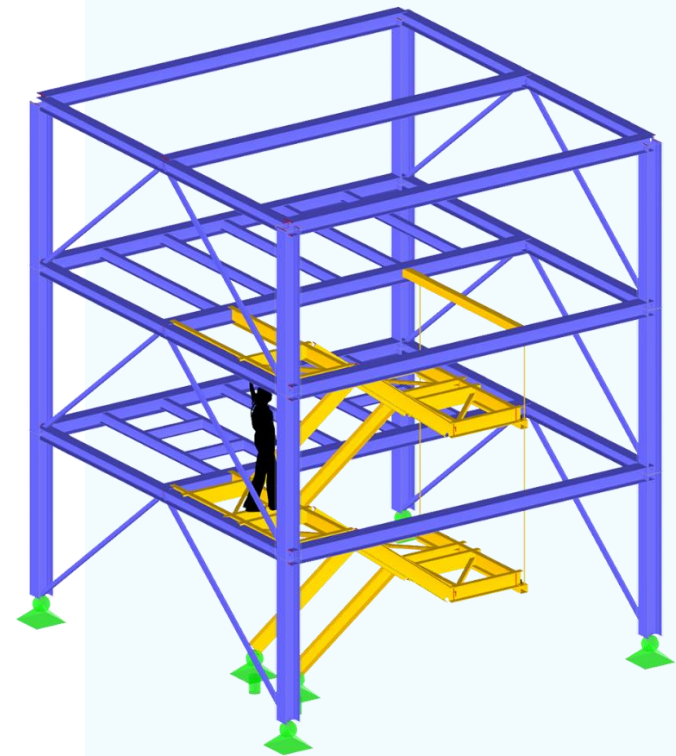
Wed, Nov 29, 2023 | 4:00 PM - 5:00 PM CET

**RFEM 6 | Students
Timber Design**



CONTENT

- 01 Introduction to RFEM user-interface
- 02 Introductory example: Single-span beam
- 03 Advanced analysis examples
- 04 Influence of 2nd order theory
- 05 Linear bifurcation / Stability analysis





User-interface

Navigator

Menu bar

Toolbar

Viewcube

Workspace

Table

Status bar

ONLINE TRAINING

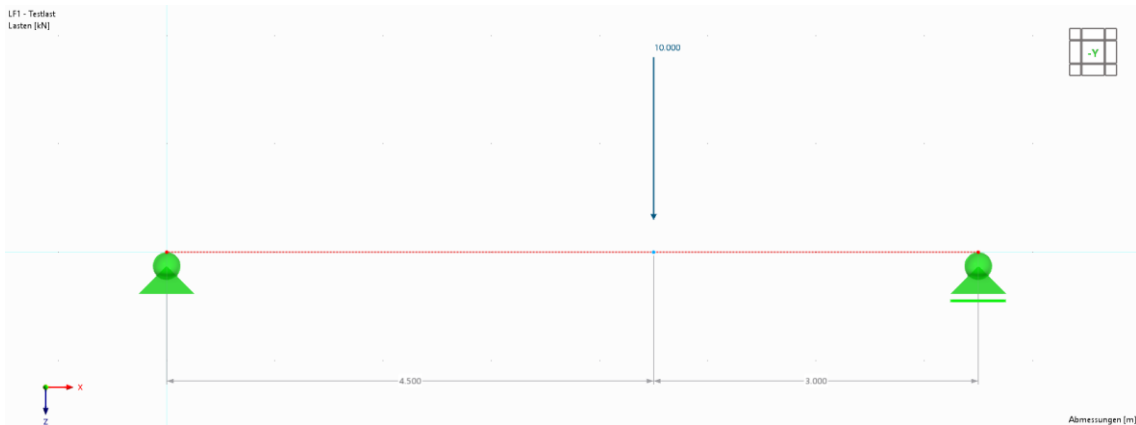
The screenshot displays the RFEM software interface. At the top, there is a menu bar with options like File, Edit, View, Insert, Assign, Calculate, Results, Tools, Options, Window, CAD-BIM, and Help. Below the menu bar is a toolbar with various icons for file operations, editing, and analysis. On the left side, there is a Navigator tree showing a hierarchical structure of the model, including Basic Objects, Materials, Sections, Thicknesses, Nodes, Lines, Members, Surfaces, Openings, Solids, Line Sets, Member Sets, Surface Sets, and Solid Sets. The main workspace shows a 3D mesh model of a structure with a coordinate system (X, Y, Z) and a Viewcube in the top right corner. At the bottom, there is a Materials table with the following data:

Material No.	Material Name	Material Type	Material Model	Modulus of Elast. E [N/mm ²]	Shear Modulus G [N/mm ²]	Poisson's Ratio ν [-]	Specific Weight γ [kN/m ³]	Mass Density ρ [kg/m ³]	Coeff. of Th. Exp. α [1/°C]	Options	Comment
1	S355	Steel	Isotropic / Plastic (Surfaces/Solids)	210000.0	80769.2	0.300	78.50	7850.00	0.000012		
2	S355H	Steel	Isotropic / Linear Elastic	210000.0	80769.2	0.300	78.50	7850.00	0.000012		
3											
4											
5											
6											
7											

At the bottom of the interface, there is a status bar showing the current state of the software, including the active object (Structure), the current view (Plane: XY), and the status of various tools (SNAP, GRID, LGRID, OSNAP).



Single-span beam with concentrated load



Step by Step

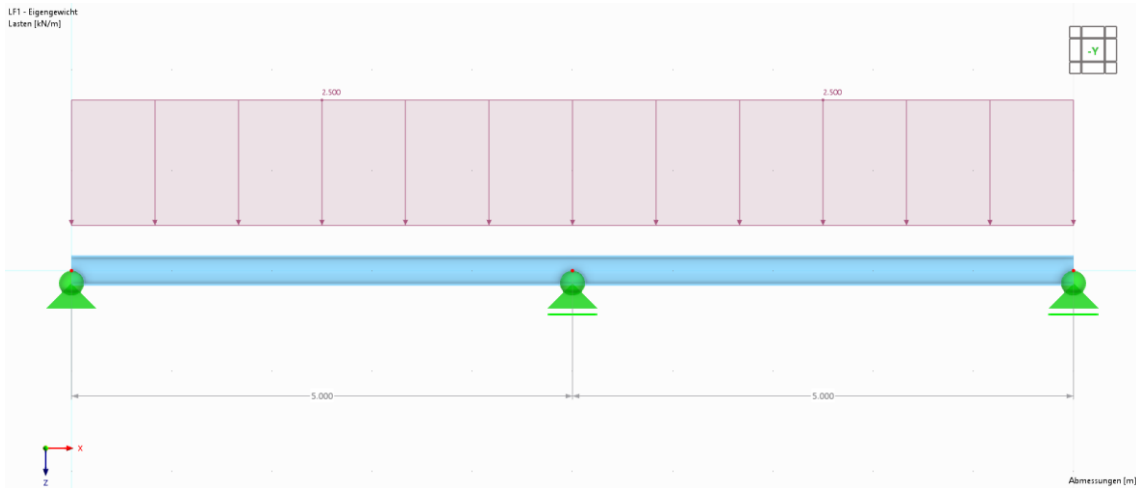
- Modeling
- Loadcases and Loads
- Calculation
- Results

Result interpretation

- Support Reaction
- Internal Forces
- Deformation



Two-span beam with altering load position



Information

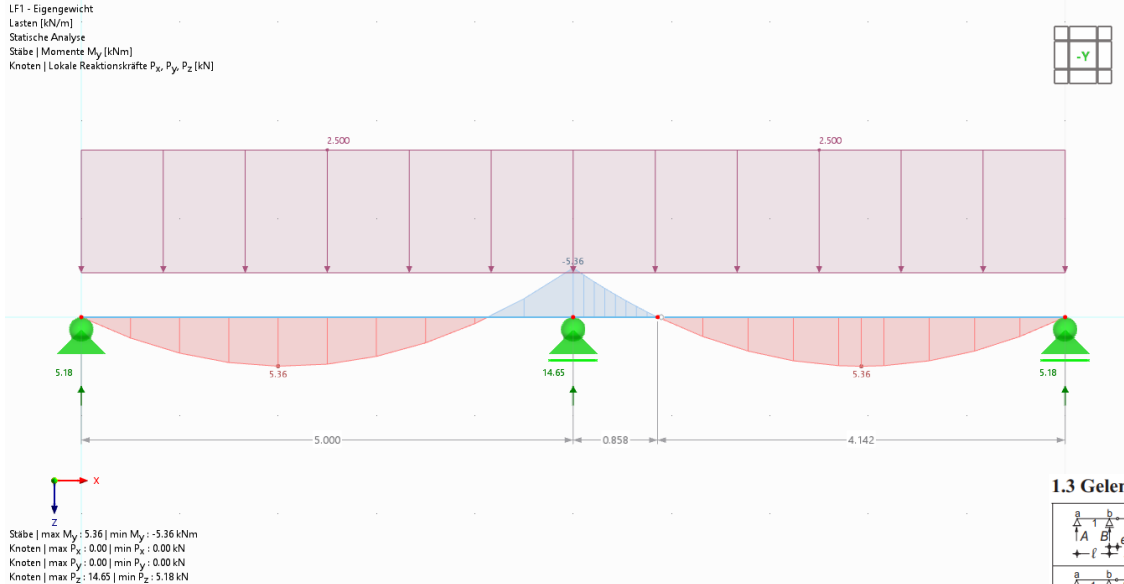
- HEB 300, S235
- LC 1: Self-weight | $g = 2,5 \text{ kN/m}$
- LC 2: Imposed load left | $q = 5,0 \text{ kN/m}$
- LC 3: Imposed load right | $q = 5,0 \text{ kN/m}$

Tasks

- Determine the support forces, internal forces and deformations
- Determine the governing load combination that causes the largest internal forces



Gerber beam / Hinged beam



Information

- Schneider Bautabellen (24. Edition): page 4.13
- Eccentricity e : $0,1716 \times L$

Tasks

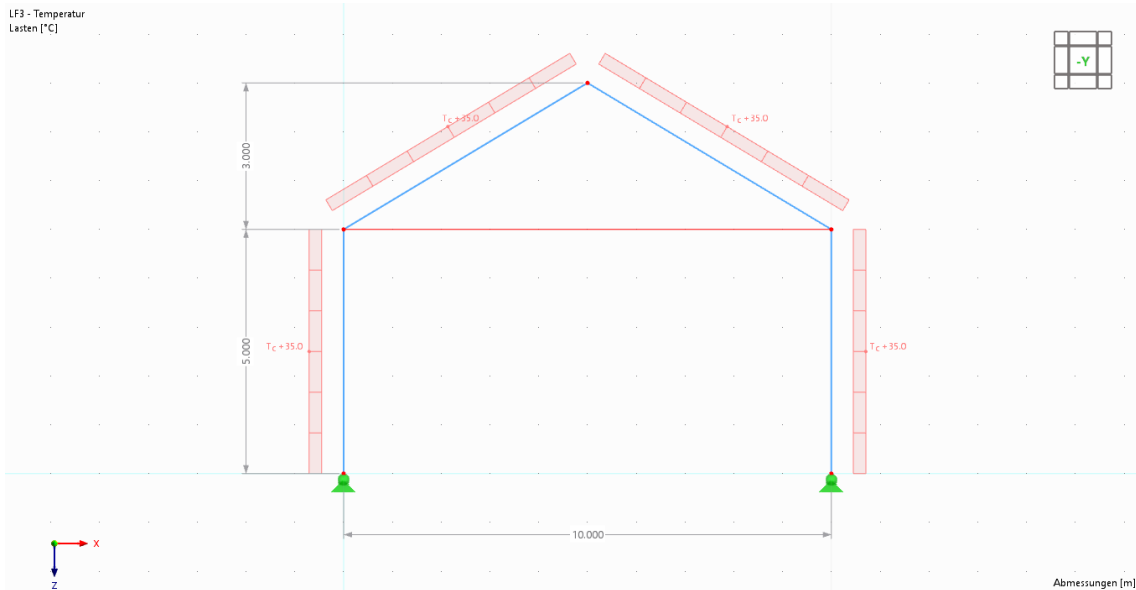
- Parametrize the structure

1.3 Gelenkträger (Gerberträger)¹⁾ mit Streckenlast q

	$e = 0,1716 l$	$A = 0,414 ql$ $B = 1,172 ql$	$M_1 = 0,0858 ql^2$ $M_2 = 0,0858 ql^2$ $M_3 = -0,0858 ql^2$	$f_1 = \frac{ql^4}{130 EI}$
	$e = 0,22 l$	$A = 0,414 ql$ $B = 1,086 ql$	$M_1 = 0,0858 ql^2$ $M_2 = 0,0392 ql^2$ $M_3 = -0,0858 ql^2$	$f_1 = \frac{ql^4}{130 EI}$
	$e = 0,1250 l$	$A = 0,438 ql$ $B = 1,063 ql$	$M_1 = 0,0957 ql^2$ $M_2 = 0,0625 ql^2$ $M_3 = -0,0625 ql^2$	$f_1 = \frac{ql^4}{130 EI}$
	$e = 0,1716 l$	$A = 0,414 ql$ $B = 1,086 ql$	$M_1 = 0,0858 ql^2$ $M_2 = 0,0392 ql^2$ $M_3 = -0,0858 ql^2$	$f_1 = \frac{ql^4}{130 EI}$



Two-hinged frame with tie rod



Information

- Frame: HEB 300, S235
- Tie rod: R30
- LC 1: Snow | $s = 1,0 \text{ kN/m}$
- LC 2: Wind | $w = 1,0 \text{ kN/m}$
- LC 3: Temperature increase of the frame
 $T_c = 35 \text{ K}$

Tasks

- Determine the support forces, internal forces and deformations

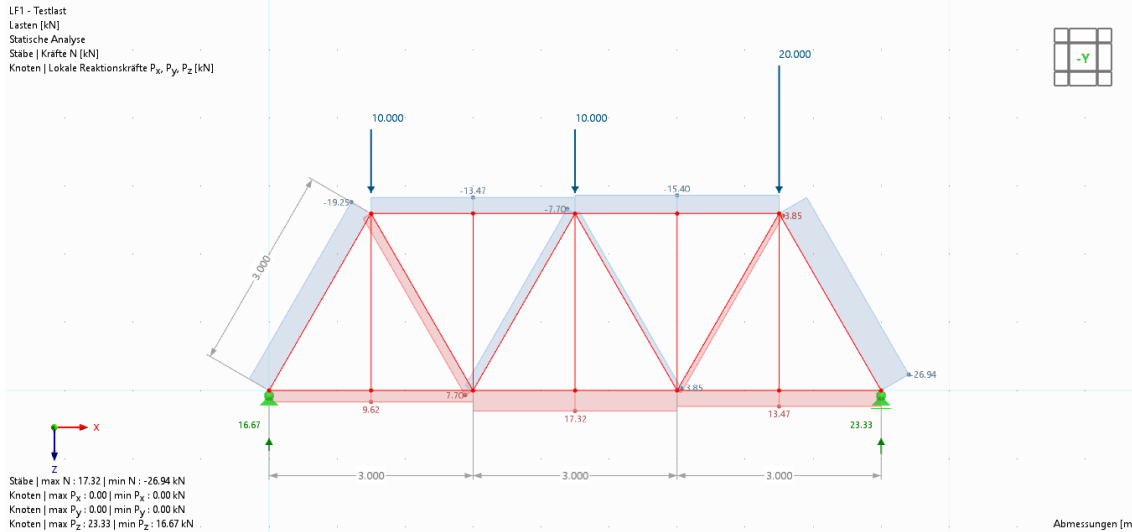
Dlubal Software

Coffee Break





Ideal truss structure



Information

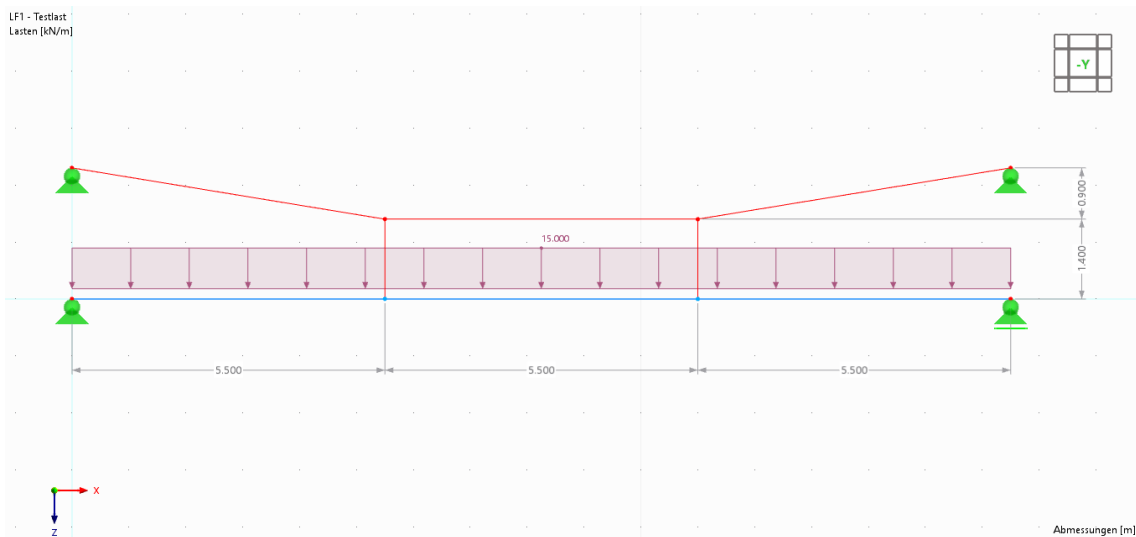
- Members: HEB 300, S235
- Nodal loads as indicated
- Member Type: Truss (only N)

Tasks

- Determine the support forces and internal forces
- Determine the null members
- Which members are loaded in tension / compression?



Suspended single-span beam



Information

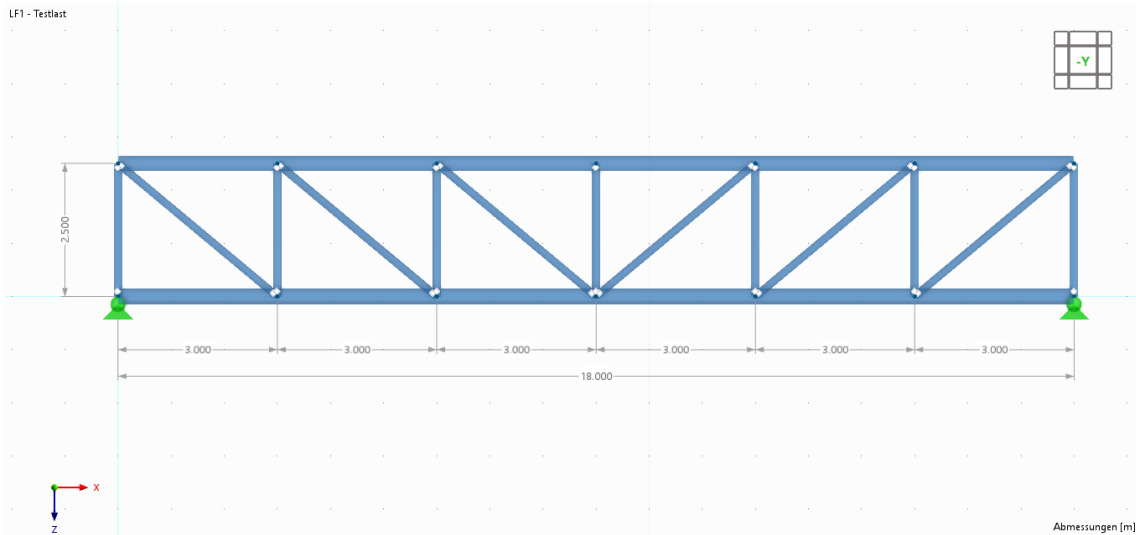
- Truss members: IPE 200, S235
- Beam: HEB 300, S235
- Distributed load: $q = 15 \text{ kN/m}$

Tasks

- Determine the support forces and internal forces



Generated truss structure



Information

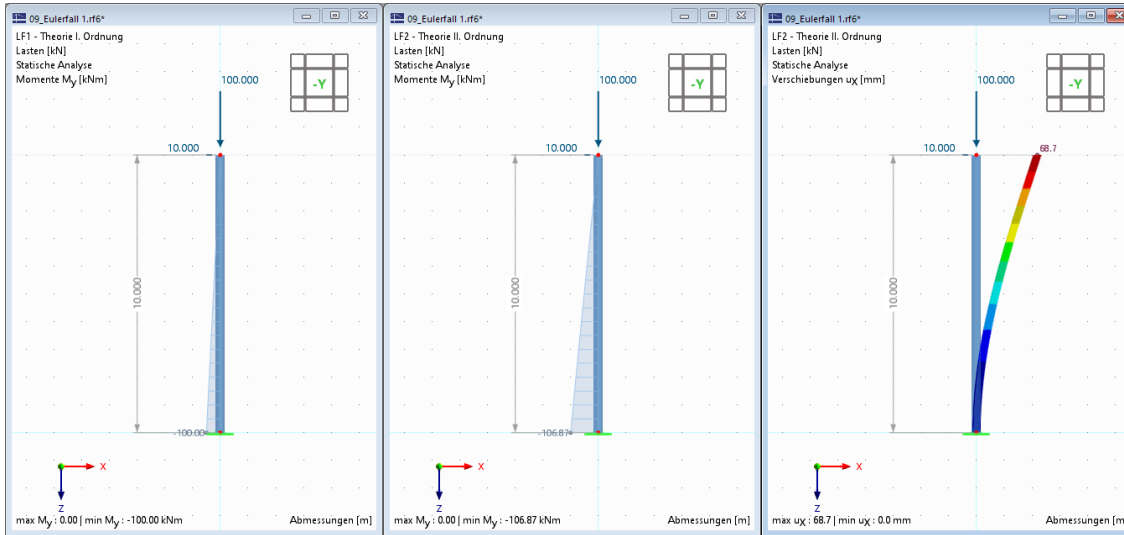
- Upper/lower Chord: HEA 300, S235
- Diagonals: IPE 160, S235
- Posts: HEA 160, S235

Tasks

- Get familiar with blocks
- Replace the beam members with regular truss members



Fixed column | 1st and 2nd order theory



Information

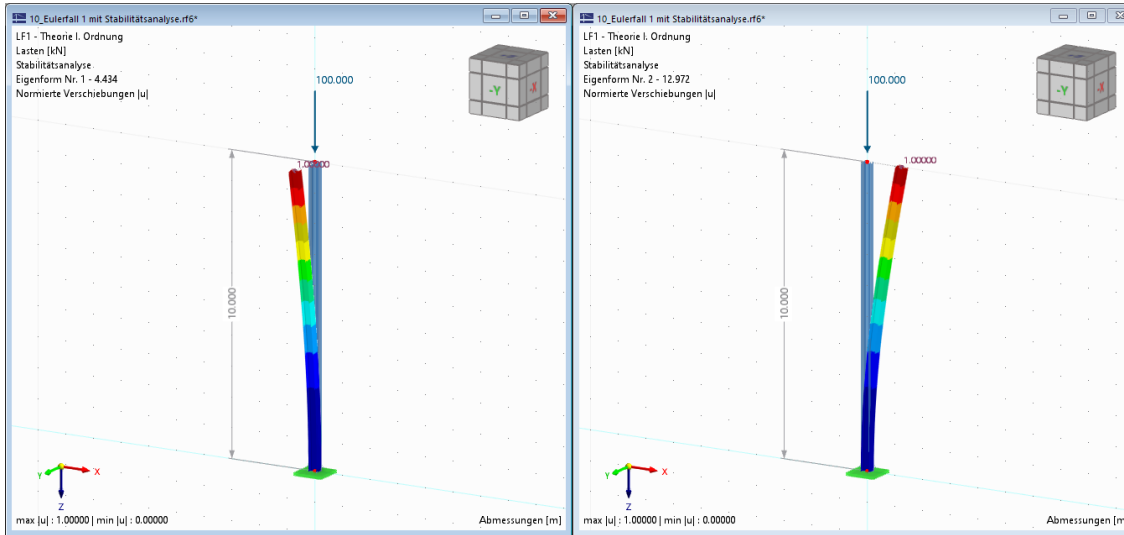
- Fixed column: HEB 300, S235
- Nodal load: $P_z = 100$ kN, $P_x = 10$ kN

Tasks

- Study the influence of 2nd order theory on the resulting internal forces and deformations



Euler-Case 1 | Mode shapes



Information

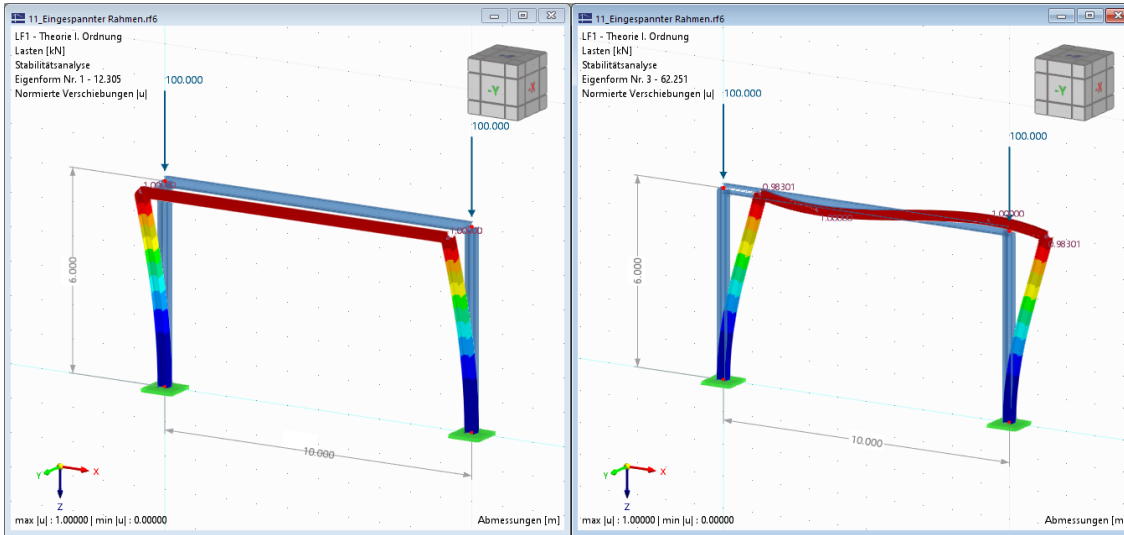
- Fixed column: HEB 300, S235
- Load: $P_z = 100$ kN
- Add-on: Structure Stability

Tasks

- Calculate the critical load of a cantilever
- Determine the critical lengths for buckling about the minor and major axis of the cross-section



Fixed frame | Mode shapes



Information

- Columns: HEB 300, S235
- Beam: IPE 300, S235
- Add-on: Structure Stability required

Aufgaben

- Compare the different mode shapes
- How to prevent the frame from buckling out-of-plane?



Open Discussion

Any Questions



— Get further information about Dlubal Software



- Videos and Recorded Webinars
- Newsletter
- Events and Conferences
- Knowledge Base Articles

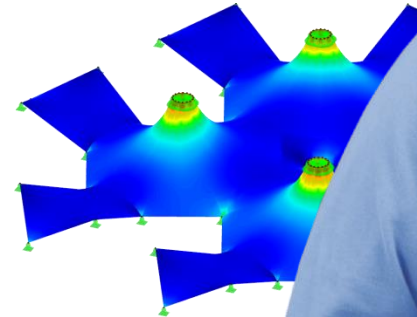
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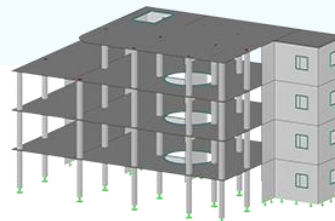


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Free Online Services



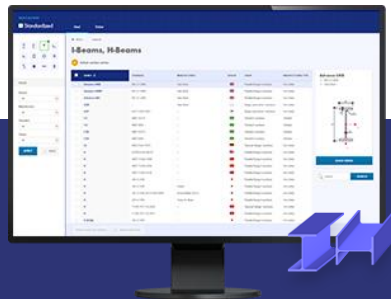
Geo-Zone Tool

Dlubal Software offers an online tool for determining the characteristic load values of the relevant load zone.



Cross-Section Properties

With this free online tool, you can select standardized sections from an extensive section library, define parametrized cross-sections and calculate its cross-section properties.



FAQs & Knowledge Base

Check out the frequently asked questions our customer support team is asked and get helpful tips and tricks with our technical articles to improve your work.



Models to Download

Download numerous example files that help you to get started and become familiar with the Dlubal programs.





Free Online Services

Youtube Channel - Webinars, Videos

Check out our videos and webinars about Dlubal's structural engineering software.



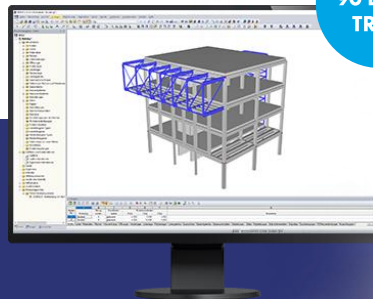
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Trial Versions

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Free Support via Email and Live Chat





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