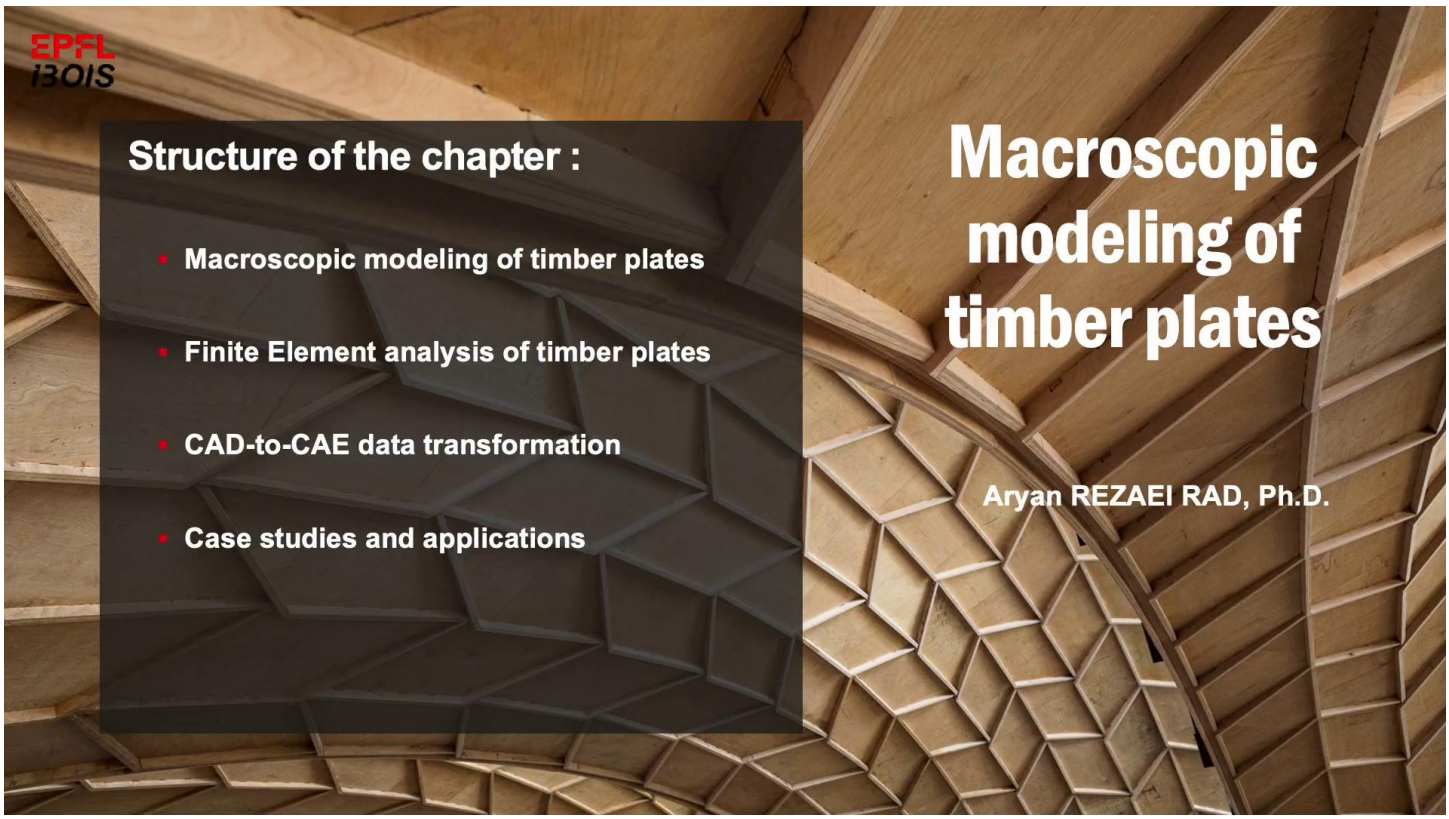

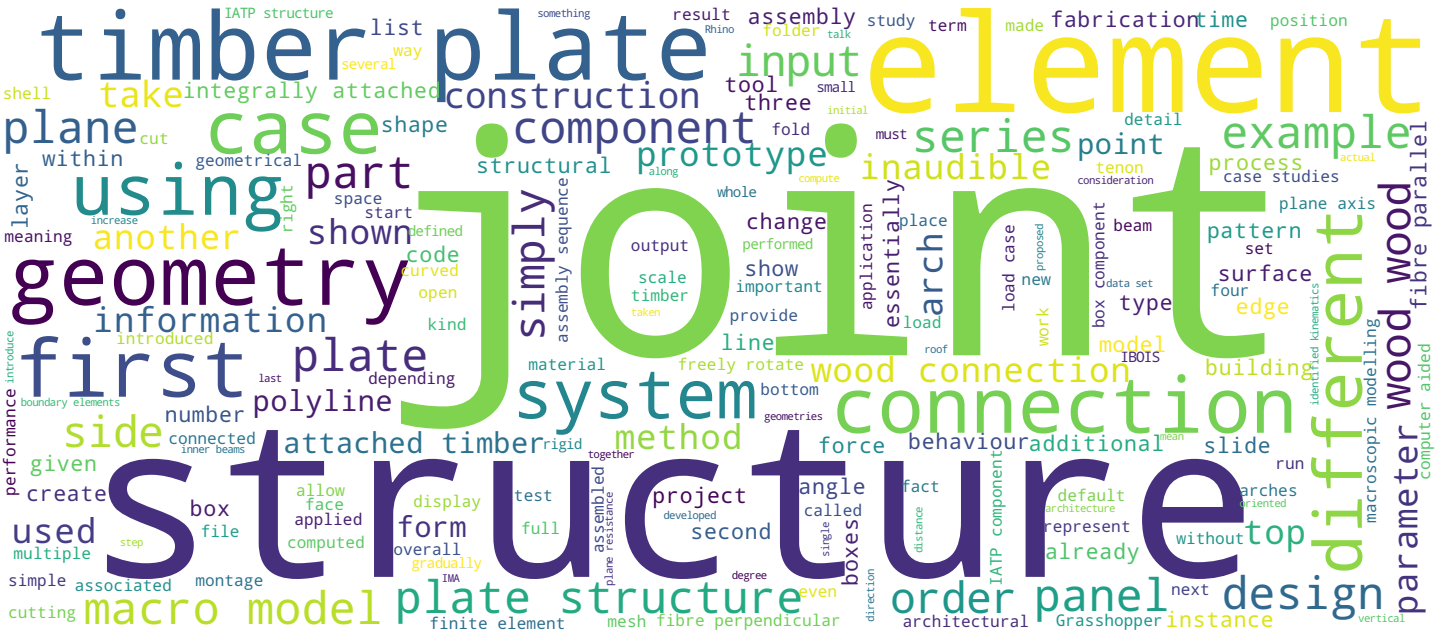

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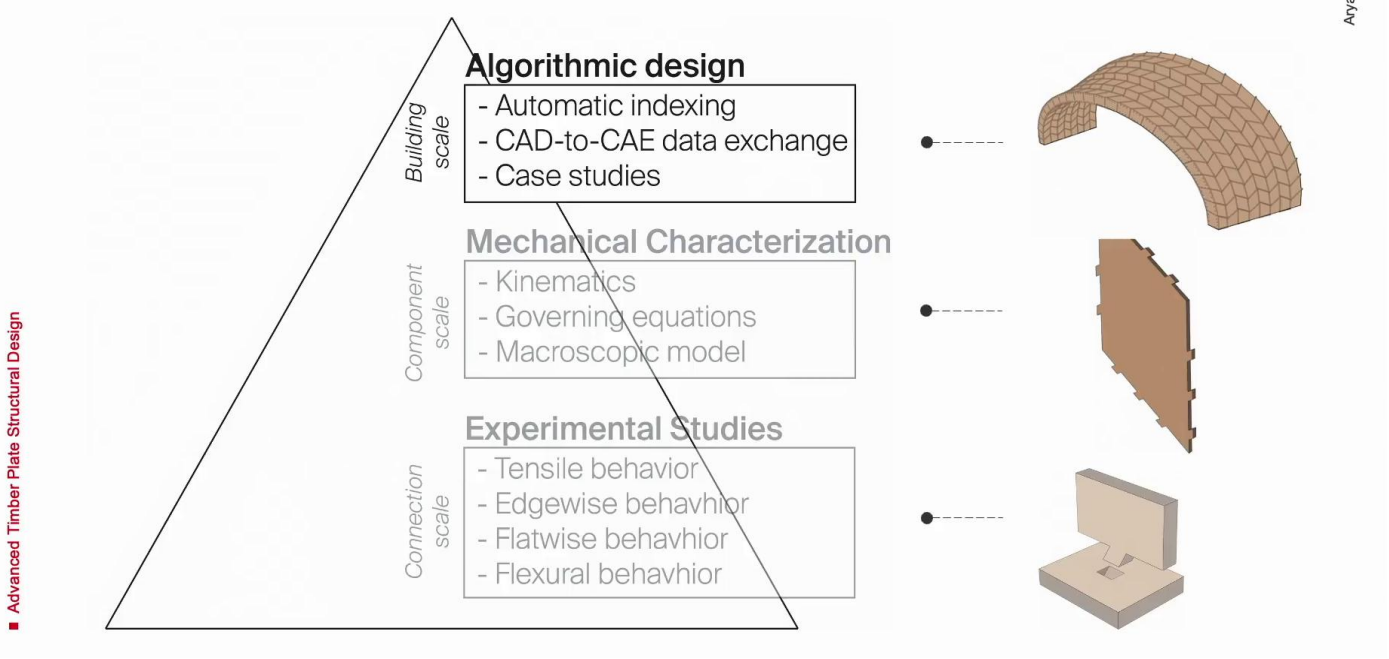
Objectives



In this session, we will be talking about simulation-based science in timber plate structures. This session consists of three main subjects: macroscopic modelling for timber plates, finite element analysis of timber plates, CAD-to-CAE data transformation, and finally case studies. So far, we have addressed the connection scale and some parts of the component scale for integrally-attached timber plate structures. In this tutorial, we will be studying the macroscopic modelling, and accordingly the macro model for integrally-attached timber plate structures and the building scale, where we study the automatic indexing and computer-aided design to computer-aided engineering data exchange, together with some very recent case studies.

Notes

Summary

0m 04s

Macroscopic model

Let's talk about the macroscopic modelling approach and the macro models in integrally-attached timber plate structures.

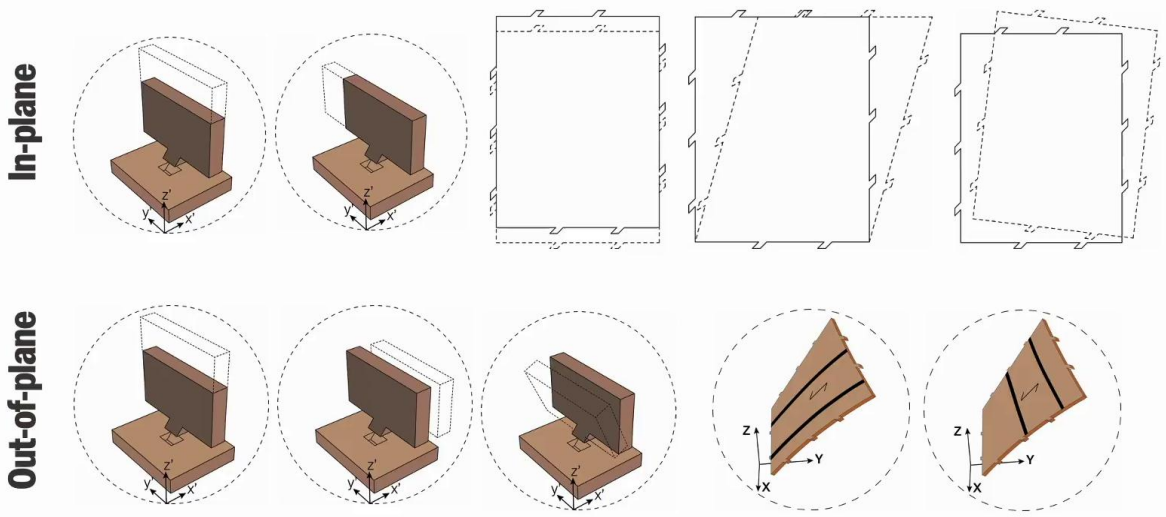
Notes

Summary

1m 11s

Macro Model

Aryan Rezaei Rad



Reiterating the identified kinematics for both in-plane and out-of-plane of the IATP structures that we extensively talked about in the previous session.

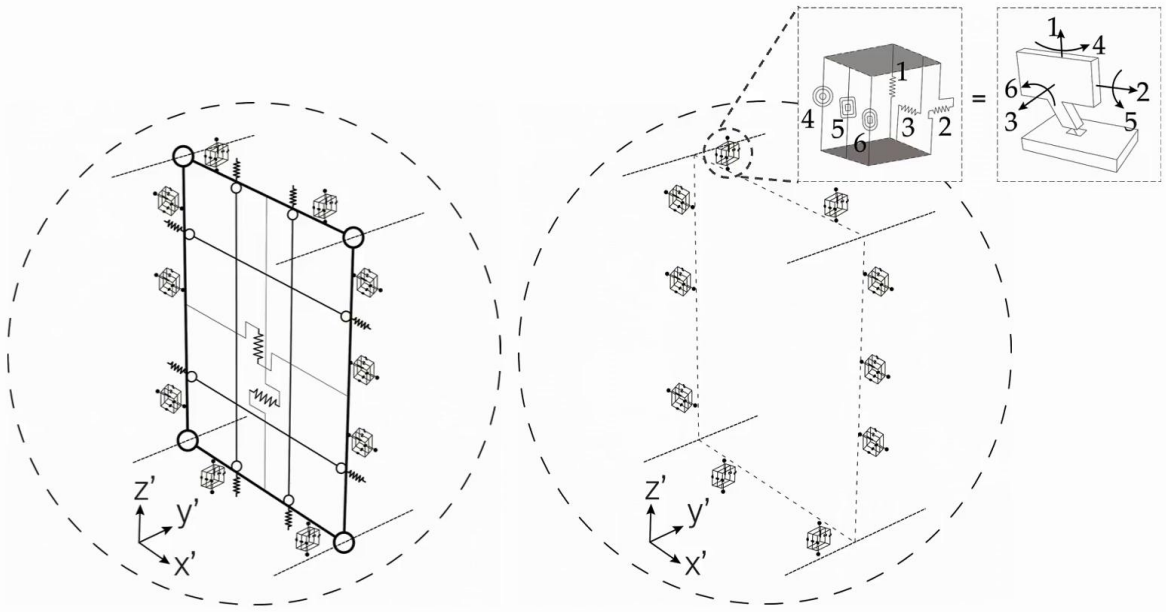
Notes

Summary

1m 20s

Macro Model

Aryan Rezaei Rad



Given the real geometry of an integrally-attached timber plate component, the proposed macro model is formulated to be compatible with different quadrilateral geometries and load cases. In other words, the macro model consists of boundary elements which are rigid and pin-ended, and they can freely rotate about the in-plane and out-of-plane axis, fibre parallel inner beams, and these elements can freely rotate about the in-plane axis, and provide out-of-plane resistance in the associated tributary area. Cross-sectional properties are also shown in this slide here. Fibre perpendicular inner beams, similar to the fibre parallel beams, these elements can freely rotate about the in-plane axis but provide out-of-plane resistance. Fibre parallel and fibre perpendicular uniaxial springs distributed along the boundary elements which capture the tension compression behaviour and in-plane frictional behaviour of the plate. Fibre parallel and fibre perpendicular sheer springs. And finally, twoNodeLink elements, which representing the integral mechanical attachment or wood-wood connections. With these sets of elements, the main identified kinematics of an IATP component can be simulated.

Notes

Summary

1m 33s