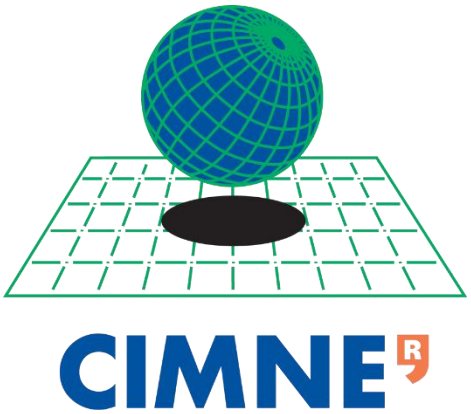


Computational Structural Mechanics and Dynamics

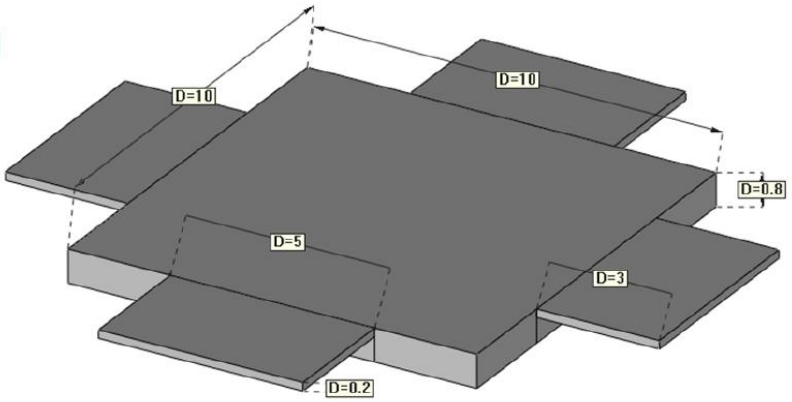
Assignment 7

Berna Eraslan

Assignment

a) Think first and answer later.
What kind of strategy (theory, elements, integration rule, boundary conditions, etc) will you use for solving the following problems:

a.1

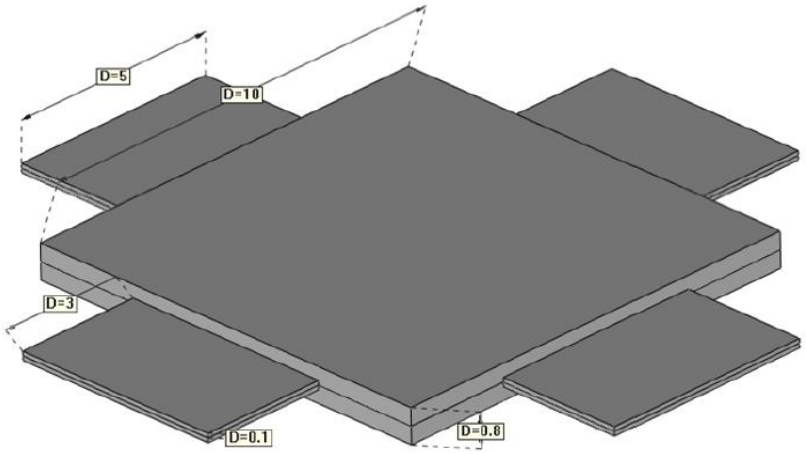


- The connection plates are non-symmetrical. The thin plates that are connected to the thick main plate are not centric. In order to solve this problem, we can not use 2D model; because the eccentricity of the connection is not achievable in 2D model. Therefore we should use 3D-Volume elements.
- Also, the geometry of the plates makes it easier thanks to their hexahedral elements.
- We can use the reduces integration rule instead of using the full integration rule; thus we can save time but get less accurate results.
- Furthermore, another way to reduce the computation time is to divide the main structure into four fragments; but in this case we should be careful with the boundary conditions at the division cut. We should apply bearing in the direction of the axis and free the vertical movement and the rotation.

Assignment

a) Think first and answer later.
What kind of strategy (theory, elements, integration rule, boundary conditions, etc) will you use for solving the following problems:

a.2



- The connection plates are placed on the center axis of the main plate. Therefore we can say that this problem can be solved with a 2D system.
- Thickness/width ratios of the plates are:

➢ $\frac{t1}{w1} = \frac{0,8}{10} = 0,08 < 0,1$

➢ $\frac{t2}{w2} = \frac{0,1}{3} = 0,0333 < 0,1$

- The thickness/width ratio in thin plates is less than 0.1 thus we can use Kirchhoff Theory.
- Furthermore, quadrilateral elements can be used for the mesh thanks to the geometry.
- A reduced integration is applicable in this case.
- It can be achieved to save computation time by dividing the structure into 4 fragments considering the boundary conditions that are explained before.