MAE 263F Fall 2025 Homework_5

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I. REPORT DELIVERABLES

A. Steady displacement from discrete plate simulation (δplate) and theoretical prediction (δEB), and their normalized difference.

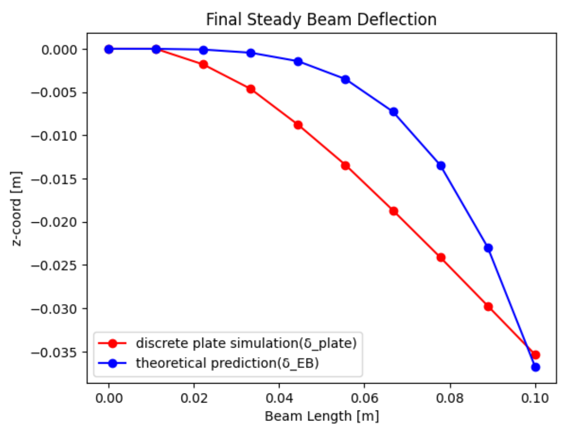

Fig. 1. Steady displacement from discrete plate simulation and theoretical prediction.

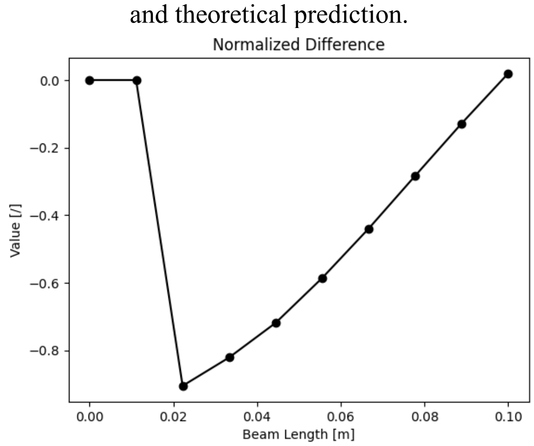

Fig. 2. Normalized difference between steady displacement simulation and theoretical prediction.

The final steady displacement beam deflection in Figure 1 and the normalized difference in Figure 2 show the simulated middle lengths of the beam differing greatly from Euler Bernoulli beam theory, albeit the final tip displacements being very close. The difference could likely be improved with finer meshing and greater number of nodes, especially with the application of discrete hinges.

B. A plot of δplate vs. time t

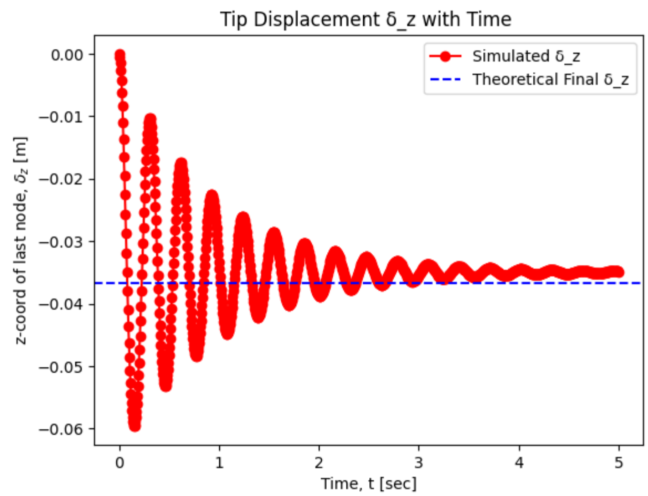

Fig. 3. Plot of discrete plate simulation with time.

Figure 3 shows the tip displacement of the beam with time as it oscillates and dampens towards the theoretical prediction from Euler Bernoulli Beam theory.

REFERENCES

[1] K. J. Majeed, Colab notebook, MAE 263F: Mechanics of Flexible Structures and Soft Robots, University of California, Los Angeles, Fall 2025.