

ME 478 Homework #9

Please show your work and draw a box around your answer to receive full credit.

- 1) Find the natural frequencies of the stepped bar shown in Figure 1. Its Young's Modulus is 30×10^6 psi and its density is 0.283 lbf/in^3 .

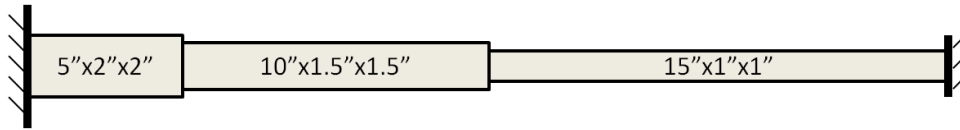


Figure 1. Stepped bar with three segments and fixed at both ends. Dimensions given for each segment are *length* \times *width* \times *height*.

- 2) Find the natural frequencies of the triangular plate shown in Figure 2. The plate is 1 mm thick and made from steel with $E = 205 \text{ GPa}$, $\nu = 0.3$, and $\rho = 7747 \text{ kg/m}^3$. Use a one-element triangular model.

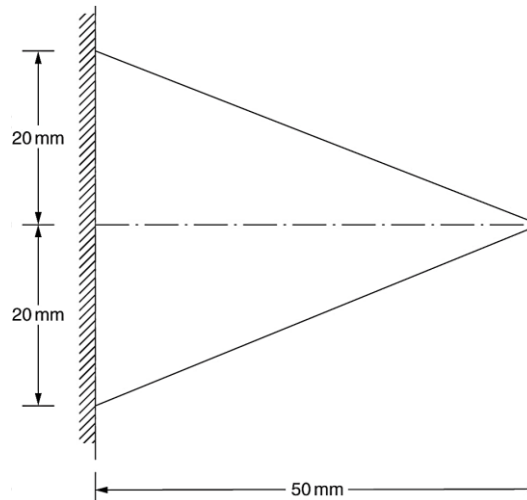


Figure 2. Triangular plate fixed at one side and with dimensions shown in mm.