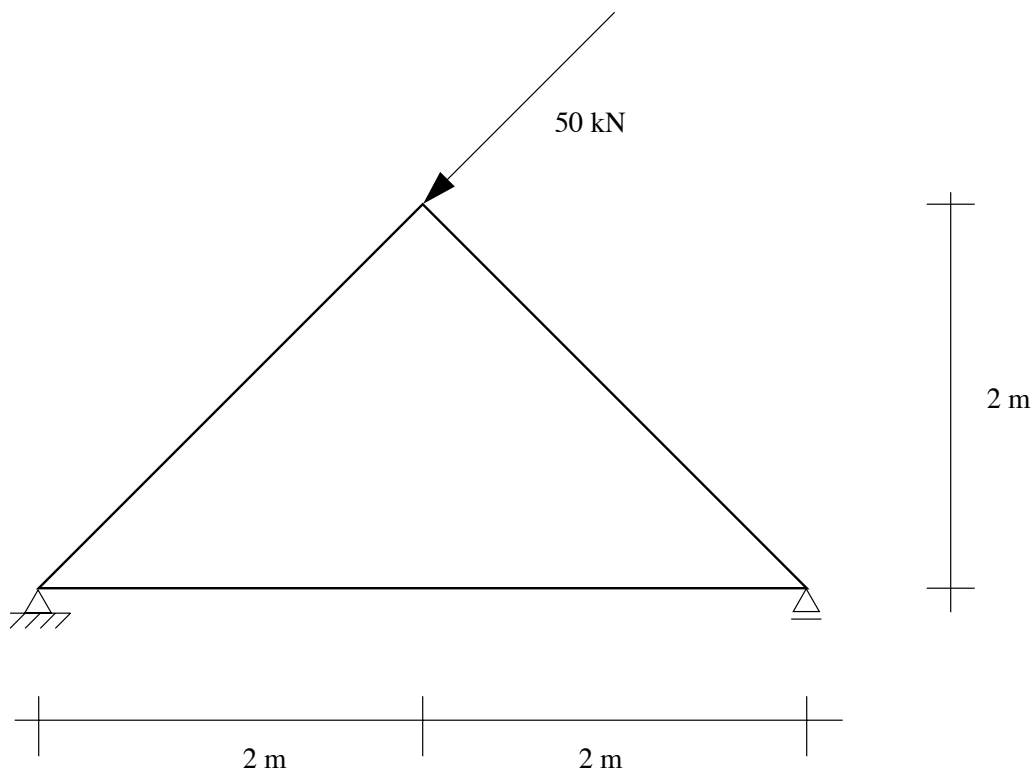


HW 2: Due Thursday Feb 12

1. Consider the truss shown below. Write out the 6x6 stiffness matrix for this truss. Assume that horizontal bar has an $AE = 180$ MN and that the other two have an $AE = 200$ MN. Using the given displacement conditions, write out the reduced 3x3 system of equations that needs to be solved (stiffness and right-hand side). You should do this problem by hand.



2. Use your program from the lab to verify your answer in question 1 and solve for the truss motion.
3. Consider a beam of length L with a distributed load $q(x) = q_0 + q_1 \frac{x}{L}$ acting in the positive y -direction. Assume that the velocity of along the loaded face of the beam at a given moment is $\mathbf{v}(x) = v_1 \mathbf{e}_x + v_2 \frac{x}{L} \mathbf{e}_y$. Find the power of the load at this moment, where q_0, q_1, v_1, v_2 are known given constants.
4. Consider a force field $\mathbf{F}(x, y) = F_1 xy \mathbf{e}_x + F_1 \mathbf{e}_y$, where F_1 is a given constant. Demonstrate that this force field is not conservative.

5. SG 2.29

6. Using conservation of energy, find the tip deflection of a cantilever beam loaded with a single point force at its end. Account only for bending energy.