**ME-7120 Finite Element Method Applications**

**Project 1**

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# Nomenclature

** = Displacement

P = Load

E = Young’s Modulus of Elasticity

I = Mass Moment of Inertia

# Project Description

1. Non-Tapered Beam:
   1. WFEM Analysis
   2. ANSYS Analysis
   3. Closed Form Solution
2. Rotated Non-Tapered Beam
   1. Use WFEM to show transformation matrix is correct
3. Tapered Beam:
   1. WFEM Analysis
   2. ANSYS Analysis
4. Complex Truss
   1. WFEM Analysis
   2. ANSYS Analysis

# Results

### Non-Tapered Beam

WFEM and ANSYS was used to analyze a non-tapered, 2 noded, 3D beam element. Figure 1 shows the non-tapered beam that is analyzed. Mesh convergence studies were conducted in both WFEM and ANSYS. Table 1 below shows the results obtained by both methods. The results where then compared to the closed form solution. Equation (1) shows how the closed form solution for a non-tapered beam was obtained.

(1)

(2)

(3)

### Rotated Non-Tapered Beam

# Conclusion

It was d

# Appendix