Due Date: March 22, 2016

COMPUTER PROJECT # 1

ME/AE 6212 Advanced Finite Element Analysis

Use ABAQUS code to analyze the water tower shown in Figure 1. Model the tower as a beam and water tank as a lumped mass as shown in Figure 2. Determine the first three frequencies for cases (a), (b) and (c). Consider two different cross-sections of the beam shown in Figure 3. Summarize the results in a table and plot the mode shapes for case (a) with solid cross-section. Take E = 207 GPa, ν =0.3, ρ = 7.8x10^{3}kg/m^3**.** Use 100 beam elements.

Figure 1. Water tower

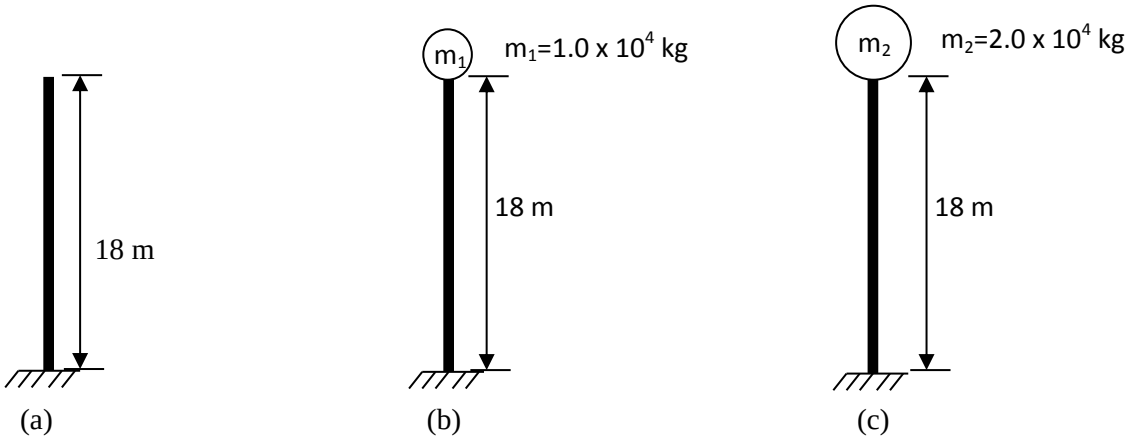

Figure 2. Beam model of water tower

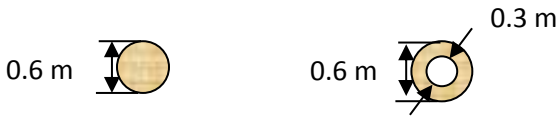

Figure 3. Cross-section of the beam

Hint for ABAQUS simulation:

(1) How to add lumped mass at the end of the beam?

Module -> Property ->Special -> Inertia ->Create -> Choose the "**Point Mass/Inertia**" -> **Continue ->** Click the end of the beam -> **Done**

(2) In **Step** Module, Set the Minimum frequency = 0.01 and Maximum frequency =50

The report should include the following:

1. Cover page (Title, name, etc.)
2. Statement of the problem
3. Procedure/Related equations
4. Summary of results with units and discussion of results
5. Sample output

The report should not exceed 20 pages.