| ME 260: Structural Optimization: Size, Shape, and Topology | | |
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| Assigned: Oct. 29, 2021 | Quiz 6 | Due: Oct. 29, 2021 |

True or False Questions

[Conducted using Poll Everywhere in the recitation class on Oct. 29th, 2021]

- 1. If it takes 10 s to solve the governing differential equation in a structural optimization problem, it takes a fraction of that time to find the sensitivity of the objective function w.r.t. the design variable.
- 2. Adjoint method of sensitivity analysis is different from the sensitivity expression extracted from the design equation in a structural optimization problem.
- 3. If a structural optimization problem has five size parameters and five constraints, adjoint method of sensitivity analysis is more computationally efficient than the direct method.
- 4. In a problem where the natural frequency of a structure is maximized subject volume constraint and strain energy constraint, if the direct method of sensitivity analysis is used, three sensitivity equations need to be solved in addition to solving the governing equation.
- 5. Interchanging of differentiation w.r.t. the optimization variable and integration over the domain cannot be done in the original domain when the optimization variable changes the domain of integration.
- 6. Shape sensitivity needs to be computed only on the boundary of the structure.
- 7. The shape of a 3D domain is changed during an optimization procedure. If the determinant of the Jacobian of shape change is 1.25 at a point, we can conclude that change in volume of a differential element at that point is 25% enhancement.
- 8. In general, the boundary conditions for the adjoint variable are the same as those of the corresponding state variable.
- 9. Reynolds Transport Theorem and Leibniz integral rule are related.