CE 422: Finite Element Analysis Assignment #2

This assignment will make use of the isoparametric bilinear quadrilateral finite element in a two dimensional plane stress analysis. Using a Commercial FEA software of your choice, analyze a 2D Bernoulli-Euler beam problem of your choice.

Because quadrilateral elements will be used to model the beam outright, the finite element mesh will be defined using nodal coordinates, connectivity, material data and element thickness.

- Select a baseline mesh resolution beginning with 1 x10, followed by 2 x 20 and 4 x 40.
- Select a reasonable set of boundary conditions for your beam.
- Subject your beam to an external loading
- Using your FEA software of choice, evaluate your beams deflections, stresses, and reaction forces.
- Verify the computed analysis values with hand calcs

Summarize your study in a brief report that includes the following:

- Problem description
- Modeling considerations
- Discussion of results and observations
    - Graphical comparison of the computed results
    - Evaluation of displacements and stresses, as compared to analytical solutions
    - Observations on patterns observed in the computed results
- Appendix
    - Input data and output data for each analysis

EXTRA CREDIT

In addition to the assessment of your beam using quad elements, evaluate your beam using solid elements using 1x1x10, 1x2x20, 1x4x40 element resolutions. Similarly, report your observed trends and findings.