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Assignment 1

Part 1

(a) The new mesh has 1800 nodes
(b) The new mesh has 240
(c) Maximum displacement of the beam is 0.3052 in

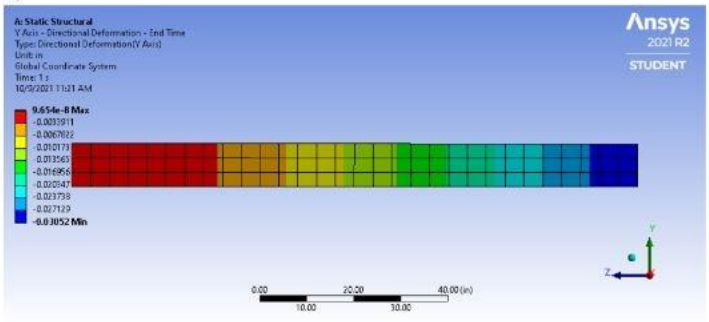
Part 1:

a.) The new mesh has 1800 nodes.

b.) The new mesh has 240 elements.

c.) The maximum deflection is .03052 [in].

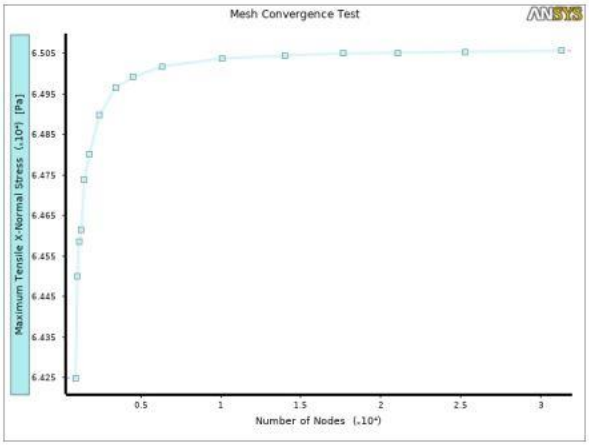
d.)



(d)

Assignment 2 – Mesh Convergence Test

Number of Nodes	Number of Elements	Maximum Element Skewness	Maximum Tensile X-Normal Stress (Pa)
913	282	0.49046	64249
999	310	0.56642	64501
1109	346	0.58770	64584
1262	395	0.45690	64614
1437	452	0.57224	64737
1772	561	0.47425	64801
2406	769	0.58199	64898
3384	1091	0.51529	64964
4494	1459	0.56416	64991
6290	2049	0.61492	65017
10092	3307	0.66611	65037
14019	4612	0.66946	65045
17646	5817	0.70727	65050
21099	6960	0.61082	65051
25312	8359	0.59597	65054
31324	10357	0.68807	65056



The mesh convergence test shows that the maximum tensile x-normal stress is mesh independent. The solution converges to a finite value as the number of nodes is increased, i.e. the solution becomes independent of the mesh.

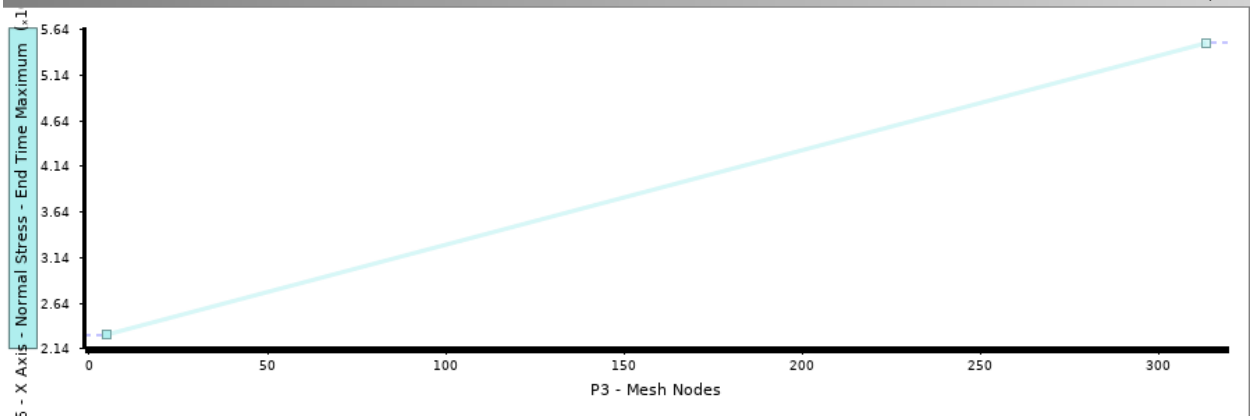
The most accurate value for maximum tensile x-normal stress is the converged value, 65056 Pa (to five significant figures).

Part 2

(a)

Table of Design Points

	A	B	C	D	E	F
1	Name	P1 - Edge Sizing Element Size	P2 - Mesh Max	P3 - Mesh Nodes	P4 - Mesh Elements	P5 - X Axis - Normal Stress - End Time Maximum
2	Units	m				Pa
3	DP 0 (Current)	0.01	0.52694	313	279	54886
4	DP 1	0				
5	DP 2	6	0.86415	5	2	22979
6	DP 3	5	0.86415	5	2	22979
7	DP 4	4	0.86415	5	2	22979
8	DP 5	3	0.86415	5	2	22979
9	DP 6	2	0.86415	5	2	22979
10	DP 7	1.8	0.86415	5	2	22979
11	DP 8	1.6	0.86415	5	2	22979
12	DP 9	1.4	0.86415	5	2	22979
13	DP 10	1.2	0.86415	5	2	22979
*						



(b)

(c) The result is mesh independent as the number of nodes and x-normal stress follows a linear relationship.

(d) Maximum tensile x-normal stress is 54886 Pa.