2.8 Thick plate under uniform pressure

REFERENCE	NAFEMS [2-3]
KEYWORDS	solid elements, layered solid elements
MODEL FILENAME	Linearstatic08.nfxa

Figure 2.8.1 shows a thick plate clamped on the middle surface, subjected to uniform pressure of 1*MPa* applied on the top surface. Utilizing symmetry, a quarter of the plate is modeled using solid and layered solid elements. Normal stress (σ_{YY}^{D}) at point D is evaluated. The reference solution is taken from the NAFEMS standard benchmarks.

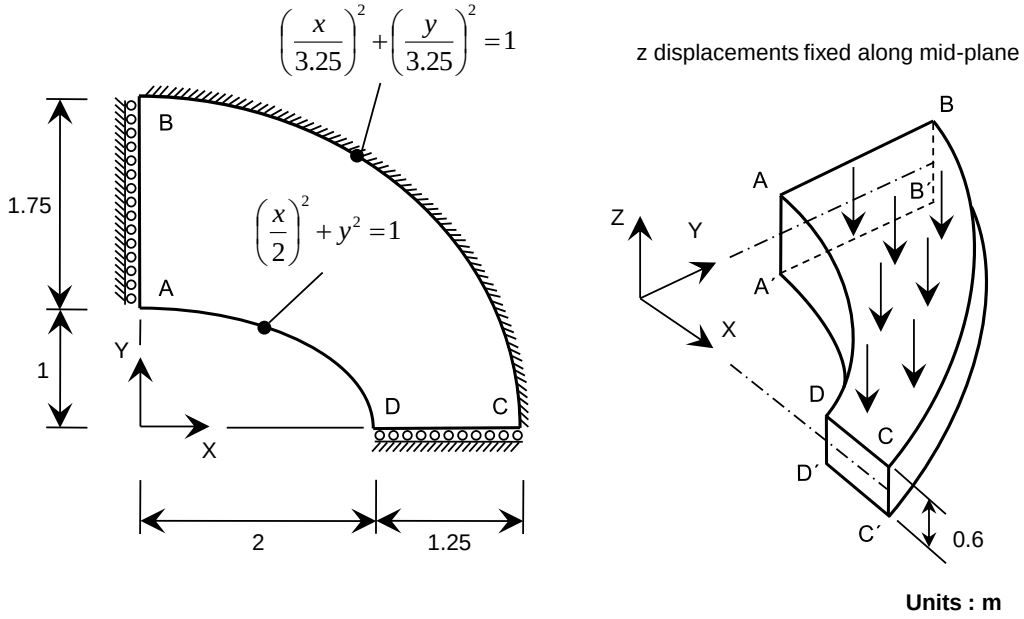

Figure 2.8.1 Thick plate model

Material data	Young's modulus	*E = 210 GPa*
	Poisson's ratio	*ν = 0.3*

Table 2.8.1 Stress σ_{YY}^{D} at point D obtained using solid elements

		σ_{YY}^{D} (*MPa*)	
Reference		*5.38*	
Number of elements per side		3×2	6×4
Element type	TETRA-4	*1.889* *2.358**	*1.970* *2.924**
	PENTA-6	*4.878* *4.501**	*5.751* *5.392**
	HEXA-8	*5.321* *6.544**	*5.577* *5.786**
	TETRA-10	*6.596* *5.878**	*5.943* *5.250**
	PENTA-15	*6.131* *5.605**	*6.039* *5.302**
	HEXA-20	*5.421* *5.252**	*5.662* *4.945**

* obtained from surface elements attached to upper face of solid mesh

Table 2.8.2 Stress σ_{YY}^{D} at point D obtained using layered solid elements

		σ_{YY}^{D} (*MPa*)	
Reference		*5.38*	
Number of elements per side		3×2	6×4
Element type	PENTAL-6	*5.478*	*5.722*
	HEXAL-8	*6.530*	*5.941*
	PENTAL-15	*6.095*	*6.427*
	HEXAL-20	*5.472*	*6.071*