14.42   PLANE42 — 2–D Structural Solid
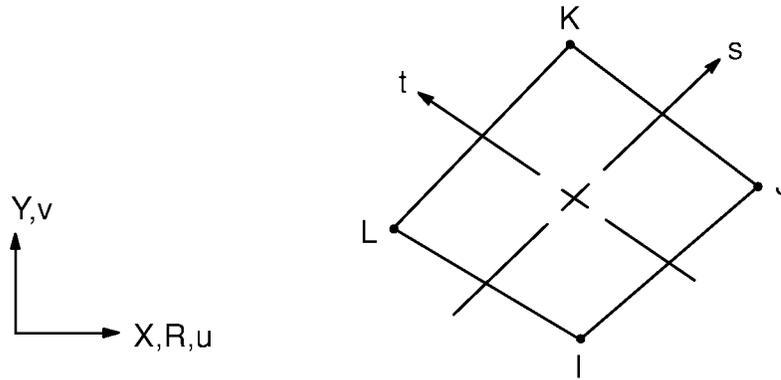
Matrix or Vector	Geometry	Shape Functions	Integration Points
Stiffness Matrix	Quad	Equations (12.6.5–1) and (12.6.5–2) and, if modified extra shapes are included (KEYOPT(2) $\neq$ 1) and element has 4 unique nodes, equations (12.6.6–1) and (12.6.6–2)	2 x 2
	Triangle	Equations (12.6.1–1) and (12.6.1–2)	3 if axisymmetric and 1 if plane
Mass Matrix	Quad	Equations (12.6.5–1) and (12.6.5–2)	Same as stiffness matrix
	Triangle	Equations (12.6.1–1) and (12.6.1–2)	
Stress Stiffness Matrix	Same as mass matrix		Same as stiffness matrix
Pressure Load Vector	Same as mass matrix, specialized to face		2

Load Type	Distribution
Element Temperature	Bilinear across element, constant thru thickness or around circumference
Nodal Temperature	Same as element temperature distribution
Pressure	Linear along each face

References: Wilson(38), Taylor(49)

14.42.1   Other Applicable Sections

Chapter 2 describes the derivation of structural element matrices and load vectors as well as stress evaluations. Section 13.1 describes integration point locations.