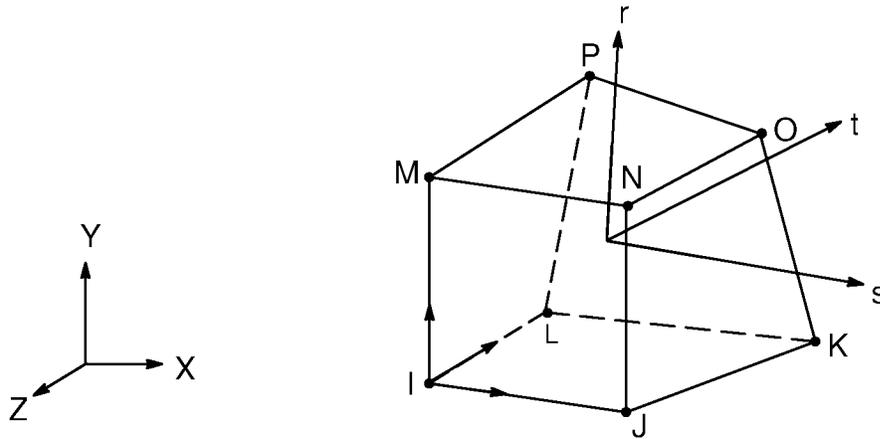


14.62 SOLID62 — 3-D Coupled Magnetic–Structural Solid



Matrix or Vector	Shape Functions	Integration Points
Magnetic Vector Potential Coefficient Matrix	Equations (12.8.18–7), (12.8.18–8) and (12.8.18–9)	2 x 2 x 2
Damping (Eddy Current) Matrix	Equations (12.8.18–1), (12.8.18–2) and (12.8.18–3)	2 x 2 x 2
Stiffness Matrix	Equations (12.8.18–1), (12.8.18–2), and (12.8.18–3) or, if modified extra shape functions are included (KEYOPT(1)=0) and element has 8 unique nodes (12.8.19–1), (12.8.19–2), and (12.8.19–3)	2 x 2 x 2
Mass Matrix	Same as damping matrix	2 x 2 x 2
Stress Stiffness Matrix	Same as damping matrix	2 x 2 x 2
Thermal Load Vector	Same as stiffness matrix	2 x 2 x 2

Matrix or Vector	Shape Functions		Integration Points
Magnetic Force Load Vector	Same as damping matrix		2 x 2 x 2
Pressure Load Vector	Quad	Equation (12.5.8-1) and (12.5.8-2)	2 x 2
	Triangle	Equation (12.5.1-1) and (12.5.1-2)	3
Permanent Magnet and Applied Current Load Vector	Same as coefficient matrix		2 x 2 x 2

Load Type	Distribution
Current Density and Phase Angle	Trilinear thru element
Element Temperature	Trilinear thru element
Nodal Temperature	Trilinear thru element
Pressure	Bilinear across each face

References: Wilson(38), Taylor et al.(49), Coulomb(76), Biro et al.(120)

14.62.1 Other Applicable Sections

Chapter 2 describes the derivation of structural element matrices and load vectors as well as stress evaluations. Sections 5.2 and 5.3 contain a discussion of the 2-D magnetic vector potential formulation which is similar to the 3-D formulation of this element. Section 13.1 describes integration point locations.