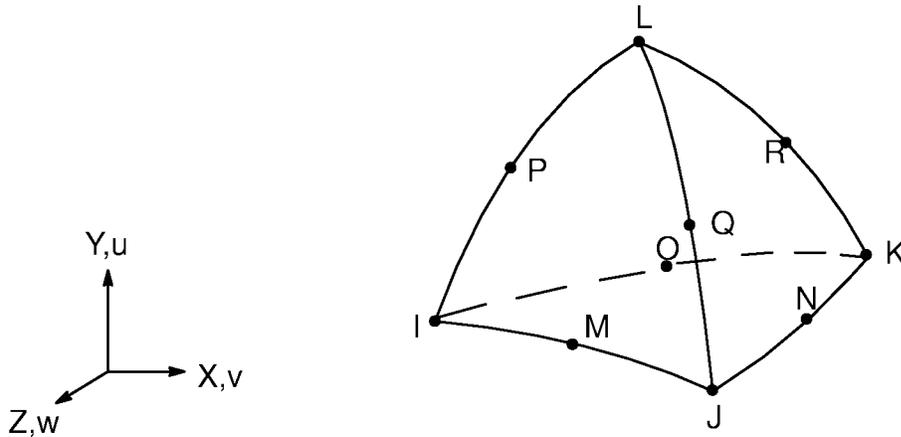


14.98 SOLID98 — Tetrahedral Coupled-Field Solid



Matrix or Vector	Shape Functions	Integration Points
Magnetic Potential Coefficient Matrix	Equation (12.8.2–22)	4
Electric Conductivity Matrix	Equation (12.8.2–21)	4
Thermal Conductivity Matrix	Equation (12.8.2–20)	4
Stiffness Matrix	Equations (12.8.2–1), (12.8.2–2), and (12.8.2–3)	4
Piezoelectric Coupling Matrix	Same as combination of stiffness matrix and conductivity matrix	4
Specific Heat Matrix	Same as conductivity matrix. If KEYOPT(3) = 1, matrix is diagonalized as described in Section 13.2	11
Mass Matrix	Same as stiffness matrix	4

Matrix or Vector	Shape Functions	Integration Points
Load Vector due to Imposed Thermal and Electric Gradients, Heat Generation, Joule Heating, Magnetic Forces, Permanent Magnet and Magnetism due to Source Currents	Same as coefficient or conductivity matrix	4
Thermal Expansion Load Vector	Same as stiffness matrix	4
Load Vector due to Convection and Pressures	Same as stiffness or conductivity matrix, specialized to the face	6

References: Zienkiewicz(39), Coulomb(76), Mayergoyz(119), Gyimesi(141)

14.98.1 Other Applicable Sections

Chapter 2 describes the derivation of structural element matrices and load vectors as well as stress evaluations. Chapter 6 describes the derivation of thermal element matrices and load vectors as well as heat flux evaluations. Section 5.2 describes the scalar potential method, which is used by this element. Section 11.1 discusses the piezoelectric capability used by the element. Section 13.1 describes integration point locations. If KEYOPT(3)=1, the specific heat matrix is diagonalized as described in Section 13.2. Also, Section 14.69 discusses the thermoelectric capability.