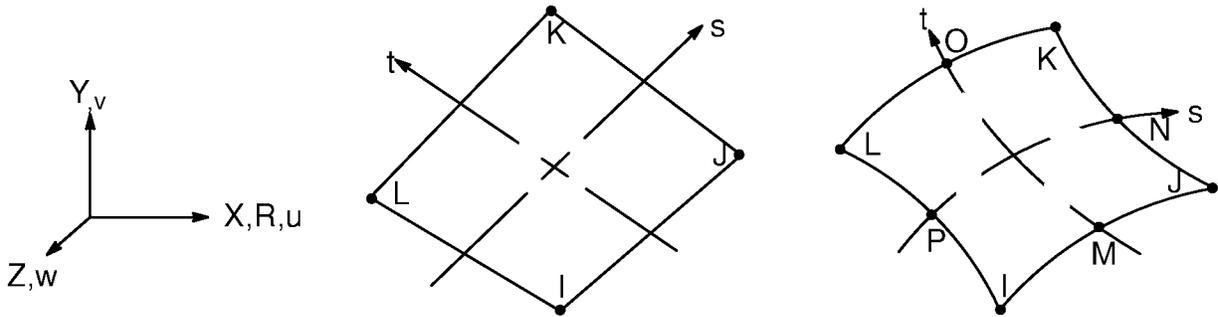


# 14.84 HYPER84 — 2-D 8-Node Hyperelastic Solid



Matrix or Vector	Geometry		Shape Functions	Integration Points
Stiffness Matrix	4 node (KEYOPT(1)=0)	Quad	Equations (12.6.5-1), (12.6.5-2), and (12.6.5-3)	2 x 2 (if KEYOPT(6) = 1, use 1 x 1 for volumetric terms)
		Tri.	Equations (12.6.1-1), (12.6.1-2), and (12.6.1-3)	1 (plane strain) 3 (axisymmetric) (if KEYOPT(6)=1, use 1 x 1 for volumetric terms)
	8 node (KEYOPT(1)=1)	Quad	Equations (12.6.7-1) (12.6.7-2) and (12.6.7-3)	3 x 3 (if KEYOPT(6) = 1, use 2 x 2 for volumetric terms)
		Tri.	Equations (12.6.2-1), (12.6.2-2), and (12.6.2-3)	3 (if KEYOPT(6)=1, use 1 x 1 for volumetric terms)

Matrix or Vector	Shape Functions	Integration Points
Mass Matrix	Same as stiffness matrix	2 x 2 (KEYOPT(1)=0) 3 x 3 (KEYOPT(1)=1)
Pressure Load Vector	Same as stiffness matrix, specialized to the face	2 (KEYOPT(1)=0) 3 (KEYOPT(1)=1)

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

Reference: Oden(27), Zienkiewicz(39), Rivlin(89), Kao(90), Mooney(91), and Blatz(92)

### 14.84.1 Assumptions and Restrictions

A dropped midside node implies that the edge is and remains straight.

### 14.84.2 Other Applicable Sections

For the basic element formulation refer to Section 14.86. The hyperelastic material models (Mooney–Rivlin and Blatz–Ko) are described in Section 4.5. Section 13.1 describes integration point locations.