FAIS-BOM-022  Maryon Asif.  Strain-Displacement relation from cylindical to spherical co-ordinate system.  UY = Ux (080 + Uy sino- U0 = Ux Y (080 + Uy y sino- U2 = U2 Y (080 + Uy y sino- U2 = U2 Y (080 + Uy y sino- U2 = U2 Y (080 + Uy y sino- U2 = U2 Y (080 + Uy y sino- U2 = U2 Y (080 + Uy y sino- U2 = U2 Y (080 + Uy y sino- U2 = U2 Y (080 + Uy y sino- U2 = R (M Q (080)- V2 = R (M Q (080)- V3 = R (M Q (080)- U3 = R (080)- U4 = U4 (080)- U4	Day   Date	
Maryam Asif.  Strain - Displacement relation from cylindical to spherical co-ordinate system.  UY = UN (080 + Uysino- U0 = UN YCOSO + Uyrsino.  U2 = U2  UR = DUY · DY + DUY · DO + DUY · DZ  DY DR DO DR DZ  A = RAM & COSO- YCOYO = RAM & COSO- YCOYO = RAM & COSO- Y = RAM & COSO+ Y = RAM	2109 / 2100	
Maryam Asif.  Strain - Displacement relation from cylindical to spherical co-ordinate system.  UY = UN (080 + Uysino- U0 = UN YCOSO + Uyrsino.  U2 = U2  UR = DUY · DY + DUY · DO + DUY · DZ  DY DR DO DR DZ  A = RAM & COSO- YCOYO = RAM & COSO- YCOYO = RAM & COSO- Y = RAM & COSO+ Y = RAM		
Strain-Displacement relation from cylindrical to spherical co-ordinate system.  UY = UN COSO + UYSINO-  U0 = UN YCOSO + UYSINO.  U2 = U2 YCOSO + UYSINO.  V3 = RSINDCOSO  Y = RSINDCOSO  Y = RSINDCOSO  Y = RSIND  Z = PCOSD  UN COSO + UYSINO)  27 21 21		
Strain - Displacement relation from cylindical to sphesical co-ordinate system.  UY = UN COSO + UYSINO  UQ = UN YOSO + UYYSINO  UR = DUY . DY + DUY - DO + DUY . DZ  DR = DUY . DY + DUY - DO + DUY . DZ  A = RIM & COSO-  YCOYO = RSIND COSO  Y = RIMD  Y = RIMD SINO  Y = RIMD  Y = RIMD SINO  Y = RSIND  Y = ROSD  DU = D (UN COSO+ UYSINO)  DY = D		Maryam Asif.
$U_{Y} = U_{x} \cos \theta + U_{y} \sin \theta$ $U_{0} = U_{x} \cos \theta + U_{y} \sin \theta$ $U_{2} = U_{2}$ $U_{2} = U_{2}$ $U_{3} = U_{2} \cdot U_{3} \cdot U_{3} + U_{3} \cdot U_{3} \cdot U_{3} \cdot U_{3}$ $U_{1} = U_{2} \cdot U_{3} \cdot U_{3$		
$U_{Y} = U_{X} \cos \theta + U_{Y} \sin \theta$ $U_{Q} = U_{X} \cos \theta + U_{Y} \sin \theta$ $U_{Z} = U_{Z}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial U_{Y}}$		Strain-Displacement relation from
$U_{Y} = U_{X} \cos \theta + U_{Y} \sin \theta$ $U_{Q} = U_{X} \cos \theta + U_{Y} \sin \theta$ $U_{Z} = U_{Z}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial U_{Y}}$		cylindrical to spherical co-ordinate
$U_{Y} = U_{X} \cos \theta + U_{Y} \sin \theta$ $U_{Q} = U_{X} \cos \theta + U_{Y} \sin \theta$ $U_{Z} = U_{Z}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $U_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x}$ $V_{R} = \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial x}{\partial x} + \frac{\partial U_{Y}}{\partial x} \cdot \frac{\partial U_{Y}}$		system.
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		Ur = Un coso + Uysino-
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		Un = U, rcosa + Cyrsina.
		U = 2 () = -
x = R & A & COSO -  Y = R & A & COSO -  Y = R & A & COSO -  Y = R & A & COSO + CYSINO)  27 = A & COSO + CYSINO)  27 = A & COSO + CYSINO)		UR = 2Ur. dr + 2Ur. 20 + 2Ur. 22
$y = R \sin \phi \cos \phi$ $y = R \sin \phi \sin \phi$ $y = R \sin \phi \sin \phi$ $y = R \sin \phi \sin \phi$ $y = R \sin \phi$ $z = R \cos \phi$ $\partial u = \partial \left( U_{\Lambda} \cos \phi + U_{Y} \sin \phi \right)$		
$y = R \sin \phi \sin \phi$ $y = R \sin \phi \sin \phi$ $y = R \sin \phi$ $y = R \sin \phi$ $z = R \cos \phi$ $y = \partial \left( U_{N} \cos \phi + U_{N} \sin \phi \right)$		2 RUM & COSO-
$y = R \sin \phi \sin \phi$ $y = R \sin \phi \sin \phi$ $y = R \sin \phi$ $y = R \sin \phi$ $z = R \cos \phi$ $y = \partial \left( U_{N} \cos \phi + U_{N} \sin \phi \right)$		rcerso = Rigino cosso
$ \begin{array}{rcl}  & Y & = & R & Sin \phi \\  & \overline{Z} & = & R & Cos \phi \\  & \underline{\partial U} & = & \underline{\partial} & \underline{U} & \underline{U} & \underline{V} & \underline{SO} + \underline{U} & \underline{V} & \underline{Sin} & \underline{O} \end{array} $		f = Rsing
$ \begin{array}{rcl}  & Y & = & R & Sin \phi \\  & \overline{Z} & = & R & Cos \phi \\  & \underline{\partial U} & = & \underline{\partial} & \underline{U} & \underline{U} & \underline{V} & \underline{SO} + \underline{U} & \underline{V} & \underline{Sin} & \underline{O} \end{array} $		y = R sin & cino
DU = 2 (Un cosot Uysino)		BYNO z RYNO SINO
DU = 2 (Un cosot Uysino)		Y = R sino
27 21	1	Z = Rcosp
= COSO 2 UX + SINO 2 UY TOX M		DU = 2 (Un cosot Uysino)
= COSO 2 UX + SINO 2 UY		27 21
DY 105 1		= CO302, Ux + SinO20y
		10x 47

te  $\frac{2}{2}\frac{2}{2}\frac{1}{2}$ Jy. X - 4 00 5x2+42 22+42 Dr. y + 22 00 + sino 2 [Ur y - Uo & - 15(742].