



STAGS "crude" 180-degree  
"soccerball" model

This n=3 mode shape is used as a "trigger" (Wimp=0.001 inch) for the next nonlinear collapse run  
 STAGS nonlinear buckling mode 1, pcr=1.0534 x 460 psi  
 step 14 eigenvector: deformed geometry of "trigger" imperfection  
 nonlinear buckling of optimized thick-apex unstiffened shell with a +mode 1 axisymmetric imperfection shape

$\Theta$  x -35.84  
 $\Theta$  y -13.14  
 $\Theta$  z 35.63

y z x

Fig. 212 Elastic-plastic analysis of the **optimized unstiffened equivalent ellipsoidal shell with thick apex,  $t(\text{apex}) = 0.47183$  in; Wimp=0.1 inch; the optimum design is listed in Table 89.** This nonlinear bifurcation buckling mode shape with  $n = 3$  circumferential waves (1.5 circumferential waves over 180 degrees of circumference) is used as a "trigger" imperfection with amplitude, Wimp(trigger) = 0.001 inch, in order to obtain the second trace in the previous figure.