Equator (outer edge of shell unit 12)

Symmetry boundary conditions are applied along the two meridionally oriented edges.

This is a more refined STAGS finite element model of the optimized isogrid-stiffened equivalent ellipsoidal shell than the 360-degree model displayed in several previous figures. Here only a 10-degree slice is included in the STAGS model and the meridional mesh spacing decreases from equator to pole such that the finite elements remain approximately square. This model is used to re-compute the collapse pressure and the extreme fiber stresses at the external design pressure, p = 460 psi.

Pole: undeformed shell

STAGS 10-degree slice model

Pole: deformed shell

mode 1, pcr(STAGS) = 2.8336 x 460 = 1303.4 psi; BIGBOSOR4 gets 1305.7 psi
meridional mesh density for approximately square finite elements   Θ x -35.84
                                                                      Θ y -13.14
eigenvector, deformed geometry; model with 10 degrees of circumference Θ z 35.63
linear buckling of perfect shell: isogrid-stiffened equivalent ellipsoid: eqellipse.stiffened.opm4

Fig. 36 STAGS prediction of linear bifurcation buckling of the optimized **isogrid-stiffened** equivalent ellipsoidal shell from a refined model that subtends 10 degrees of circumference. This is the fundamental (lowest eigenvalue) buckling mode from STAGS. The analogous axisymmetric mode computed by BIGBOSOR4 (Fig. 4) is called "**mode 1**" in the GENOPT jargon. Compare with Figs. 4 and 6.