



Fig. 190 Linear buckling mode from STAGS 180-degree "crude" soccerball model that corresponds to the third eigenvalue for the **optimized unstiffened equivalent ellipsoidal shell with the thick apex with $t(\text{apex}) = 0.4$ inch; the optimum design is listed in Table 78.** Compare this "crude" 180-degree "soccerball" model with the more refined "soccerball" model displayed in Fig. 179. This is the linear buckling modal imperfection shape (with amplitude, $W_{imp} = 0.2$ inch) that leads to the load-deflection curve identified as the fourth trace in Fig. 188 and the mode of collapse under uniform pressure shown in Fig. 192. **Shells of revolution with imperfections with this non-axisymmetric shape cannot be handled by BIGBOSOR4.** Therefore, GENOPT optimization occurs in the presence of only axisymmetric buckling modal imperfections.