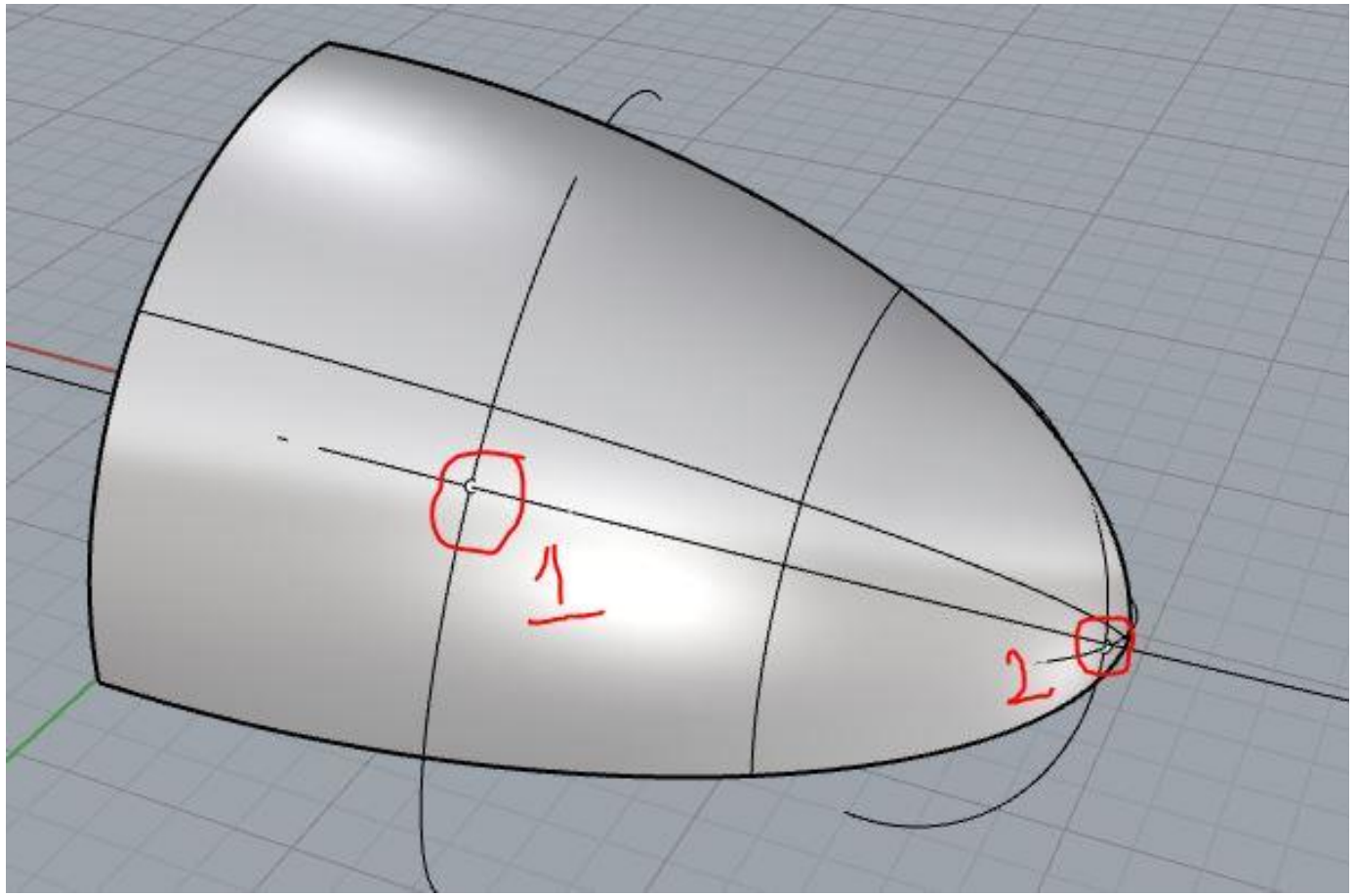
Note that for a rational surface $\mathbf{r}(u,v) = \mathbf{R}(u,v)/\omega(u,v)$, the first partial derivative $\mathbf{r}_u(u,v) = (\mathbf{R}_u - \mathbf{r}\,\omega_u)/\omega$, and the second partial derivative $\mathbf{r}_{uu} = \dfrac{\mathbf{R}_{uu} - \mathbf{r}\omega_{uu}}{\omega} - \dfrac{\mathbf{R}_u\omega_u - \mathbf{r}\omega_u^2}{\omega^2} - \mathbf{r}_u\dfrac{\omega_u}{\omega}$. Applying these to the rational Bézier patch (15.45) and letting $(u,v) = (0,0)$ lead to

Ref :T. W. Sederberg, BYU, Computer Aided Geometric Design Course Notes



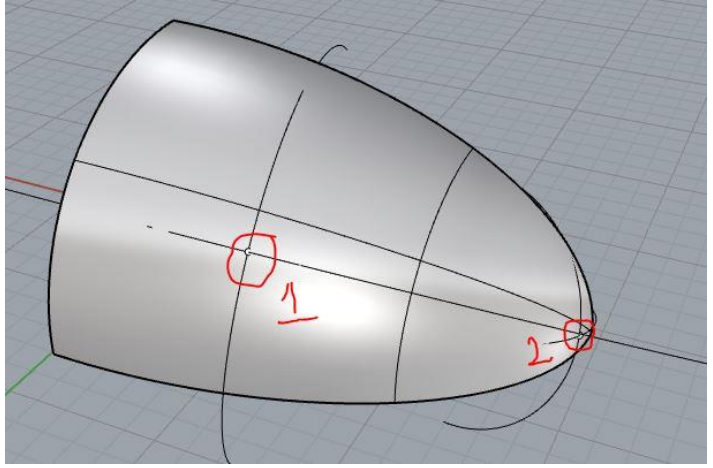
Ellipsoid_Bezier_patch. (All values are in mm)

Surface curvature evaluation at parameter (0.398402, 0.724543):
3-D Point: (-6.00468, 6.09671, 4.15242)
3-D Normal: (-0.229446, 0.790654, 0.567645)
Maximum principal curvature: -0.135522 (0.000488182, -0.583111, 0.812392)
Minimum principal curvature: -0.0448924 (-0.973321, -0.186677, -0.133406)
Gaussian curvature: 0.0060839
Mean curvature: -0.0902071

Evaluated at point 1

```
coordinates are :
-6.00951
6.09654
4.15226
normal vector is -0.229315
normal vector is 0.790755
normal vector is 0.567558
first principal curvature is -0.0432295
Second principal curvature is -0.135696
Mean curvature is: -0.0894629
Gaussian curvature is: 0.00586609
```

All values are almost same.



Surface curvature evaluation at parameter (0.319334, 0.104215):
3-D Point: (-14.524, 1.28737, 0.556327)
3-D Normal: (-0.961218, 0.244204, 0.128154)
Maximum principal curvature: -0.229408 (0.0391319, -0.339214, 0.939895)
Minimum principal curvature: -0.213836 (-0.272998, -0.908459, -0.316503)
Gaussian curvature: 0.0490558
Mean curvature: -0.221622

Evaluated at point 2

```
coordinates are :
-14.525
1.28729
0.556308
normal vector is -0.961587
normal vector is 0.24445
normal vector is 0.12488
first principal curvature is -0.0645921
Second principal curvature is -0.357283
Mean curvature is: -0.210938
Gaussian curvature is: 0.0230777
```

Coordinates are same with that of rhino

Normal vector is also same with that of rhino

Curvatures are not validating in this case