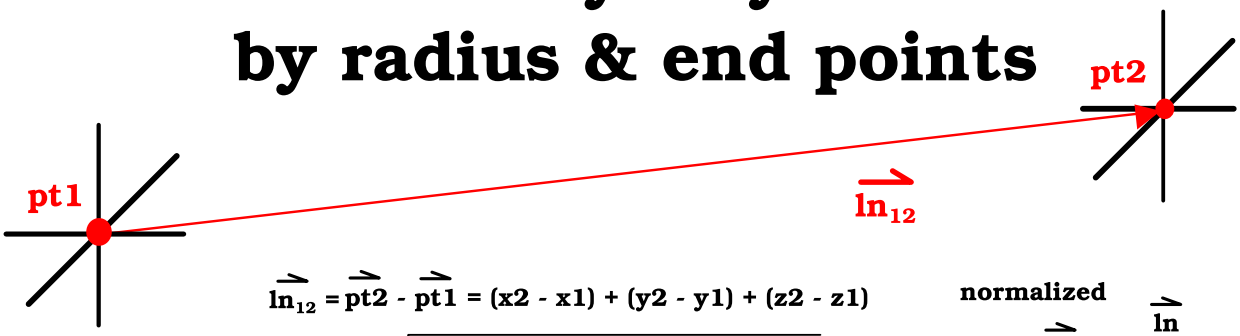
Geometry - Cylinder
by radius & end points



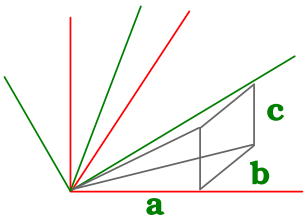
$$\vec{ln}_{12} = \vec{pt2} - \vec{pt1} = (x2 - x1) + (y2 - y1) + (z2 - z1)$$

$$| ln_{12} | = \sqrt{(x2 - x1) + (y2 - y1) + (z2 - z1)}$$

normalized

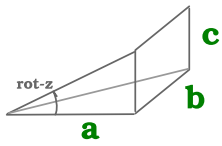
$$\vec{ln}_N = \frac{\vec{ln}}{| ln |}$$

After translating to pt2 and selecting $\vec{i}_{local}$ aligned to $\vec{ln}_N$

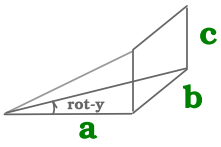


$i_{local} = ln_N = <a,b,c>_{global}$

$i_{global} = <1,0,0>_{global}$

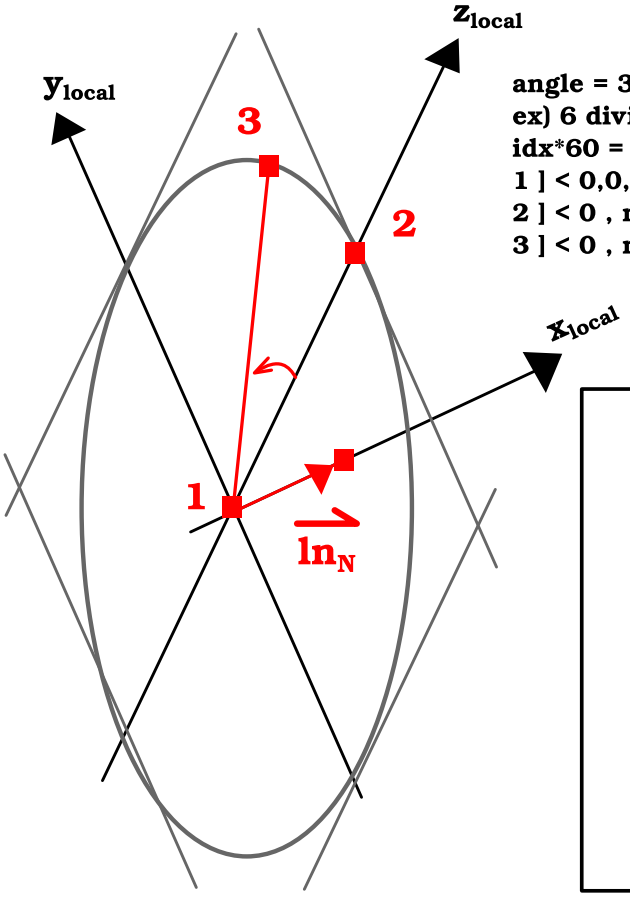


$$\tan (rot\text{-}z) = c / a$$



$$\tan (rot\text{-}y) = b / a$$

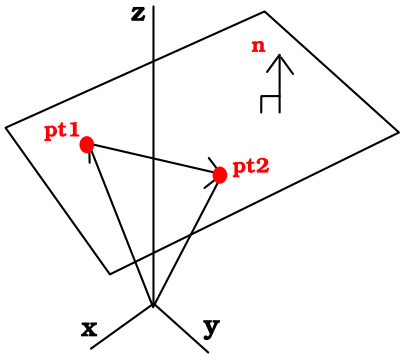
$$\begin{Bmatrix} x \\ y \\ z \end{Bmatrix}_G = \begin{vmatrix} \text{rotation-z matrix} \\ cosz & sinz & 0 \\ -sinz & cosz & 0 \\ 0 & 0 & 1 \end{vmatrix} \begin{vmatrix} \text{rotation-y matrix} \\ cosy & 0 & siny \\ 0 & 1 & 0 \\ -siny & 0 & cosy \end{vmatrix} \begin{Bmatrix} x \\ y \\ z \end{Bmatrix}_L = \begin{vmatrix} \text{rotation-zy matrix} \\ cosz * cosy & sinz & cosz * siny \\ -sinz * cosy & cosz & -sinz * siny \\ -siny & 0 & cosy \end{vmatrix} \begin{Bmatrix} x \\ y \\ z \end{Bmatrix}_L$$



Algorithm Coding
For (idx;;) Loop

angle = 360/divisions
ex) 6 divisions idx=0,1,2,4,5
idx*60 = 0,60,120,180,240,300
1] < 0,0,0>
2] < 0 , r*sin(idx*angle) , r*cos(idx*angle) >
3] < 0 , r*sin((idx + 1)*angle) , r*cos((idx + 1)*angle) >

Vector equation of a plane



$$< a , b , c > \cdot < (x2 - x1) + (y2 - y1) + (z2 - z1) > = 0$$