RADIUS of CURVATURE

SEE FIG. 8-48

REQUIREMENT FOR ROLLER FOLLOWER: $|\rho_{min}| > R_f$

MAGNITUDE OF MOST CONCAVE RADIUS OF CURVATURE OF CAM SURFACE

$\rho_{PITCH}(\theta)$ FROM EQN. 8.33

RADIUS OF CURV. OF PITCH CURVE (CUTTER PATH)

$\rho < 0 \Rightarrow$ CONCAVE ($\rho < 0$)

$\rho > 0 \Rightarrow$ CONVEX ($\rho > 0$)

SEE FIG. 8-49

CAM SURFACE CANNOT BE MANUF. PROPERLY FOR GIVEN S,V,A AND SELECTED R_p

TO PREVENT UNDERCUTTING & CUSPS ON THE CAM SURFACE, MAKE SURE THE SELECTED R_p

RESULTS IN:

FOR ROLLER FOLLOWER [$|\rho_{PITCH}| > 2 R_f$ (or 3)] DESIGN PRACTICE

OVER WHOLE CYCLE $0 < \theta < 360°$ (PLOT IN MATHCAD)

IF NOT, CHANGE R_p & CHECK ϕ & ρ AGAIN FOR $0° < \theta < 360°$

NOTE - FOR FLAT FACED FOLLOWER, ρ MAY NOT BE < 0

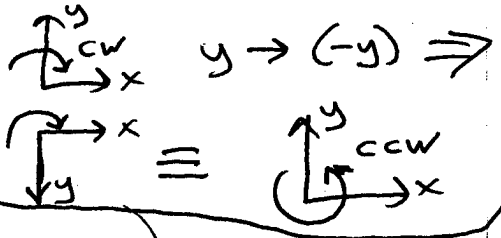
RADIUS OF CURV. OF CAM SURFACE

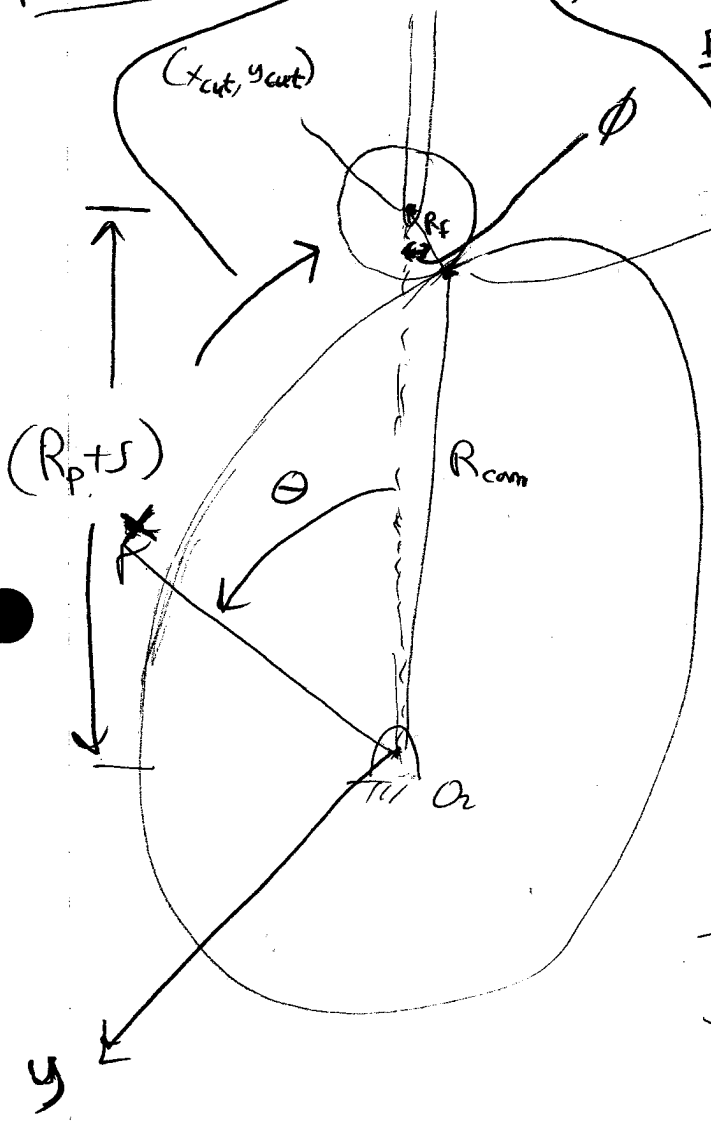
SEE "Radius of Curvature - Translating Flat-faced Follower" IN SECTION 9.6 FOR SIZING INFO

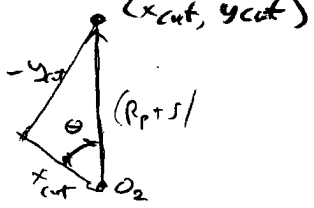
ROLLER FOLLOWER PITCH CURVE (CUTTER TOOLPATH) + CAM SURFACE

FOR $\varepsilon = 0$

(*) CUTTER PATH CW AROUND CAM. TO REVERSE, CHANGE SIGN OF x OR y.

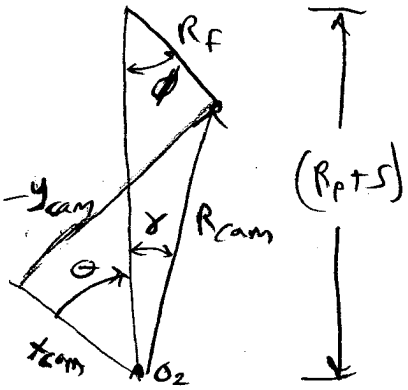
Ex.) 





$$x_{cut}(\theta) = (R_p+s)\,C_\theta$$

$$y_{cut}(\theta) = -(R_p+s)\,S_\theta$$



x-y FIXED TO CAM

LAW OF COSINES ⇒

$$R_{cam}(\theta) = \sqrt{(R_p+s)^2 + R_f^2 - 2(R_p+s)R_f\,C_{\phi(\theta)}}$$

$$x_{cam}(\theta) = R_{cam}(\theta)\cos(\theta+\gamma(\theta))$$

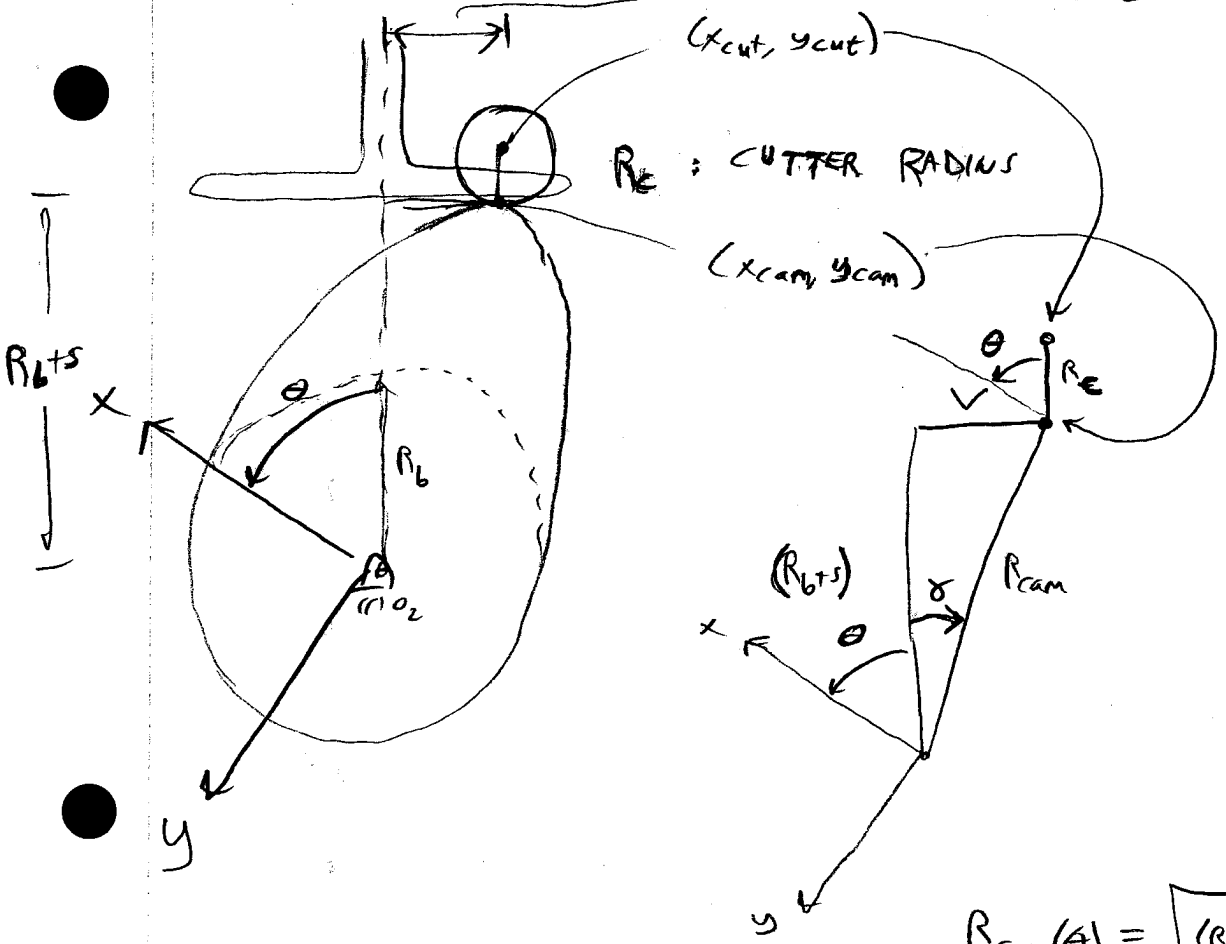
$$y_{cam}(\theta) = -R_{cam}(\theta)\sin(\theta+\gamma(\theta))$$

LAW OF SINES ⇒

$$\frac{S_\gamma}{R_f} = \frac{S_\phi}{R_{cam}} \Rightarrow \gamma(\theta) = \sin^{-1}\left[\frac{R_f \sin(\phi(\theta))}{R_{cam}(\theta)}\right]$$

FLAT FACE FOLLOWER

$V(\theta)$ — see Equation 8.39



$$R_{cam}(\theta) = \sqrt{(R_b + s(\theta))^2 + (V(\theta))^2}$$

$$\gamma(\theta) = \tan^{-1}\left(\frac{V(\theta)}{R_b + s(\theta)}\right)$$

$\gamma < 0$ WHEN $V < 0$

$$x_{cam}(\theta) = R_{cam}(\theta)\, C_{(\theta+\gamma(\theta))}$$

$$y_{cam}(\theta) = -R_{cam}(\theta)\, S_{(\theta+\gamma(\theta))}$$

$$x_{cut}(\theta) = x_{cam}(\theta) + R_c C_\theta$$

$$y_{cut}(\theta) = y_{cam}(\theta) - R_c S_\theta$$