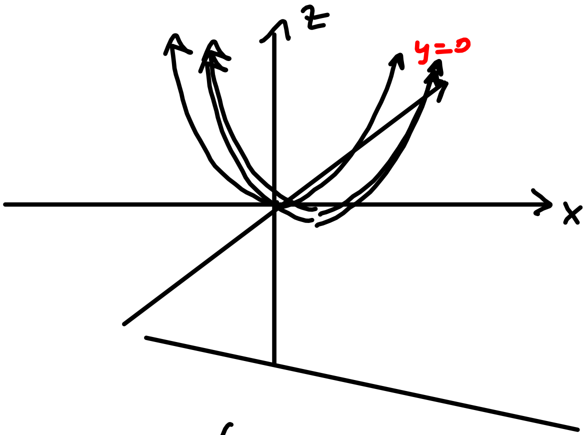
$$z = \frac{x^2}{a^2} - \frac{y^2}{b^2}$$

Fix $y = k$

$$z = \frac{x^2}{a^2} - \frac{k^2}{b^2} = \frac{x^2}{a^2} - C$$



$y = 0$.

$$z = \frac{x^2}{a^2}$$

$y = \pm 1$

$$z = \frac{x^2}{a^2} - 1$$

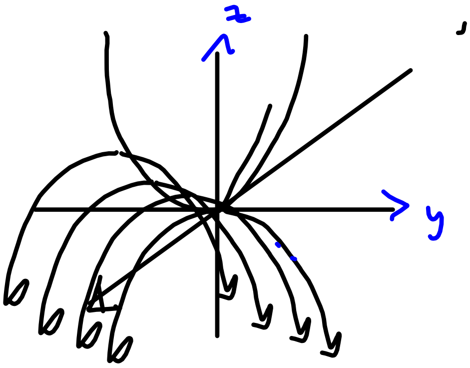
Let $x = k$ (fixed)

$$z = \frac{k^2}{a^2} - \frac{y^2}{b^2}$$

Fixed

$x = 0$

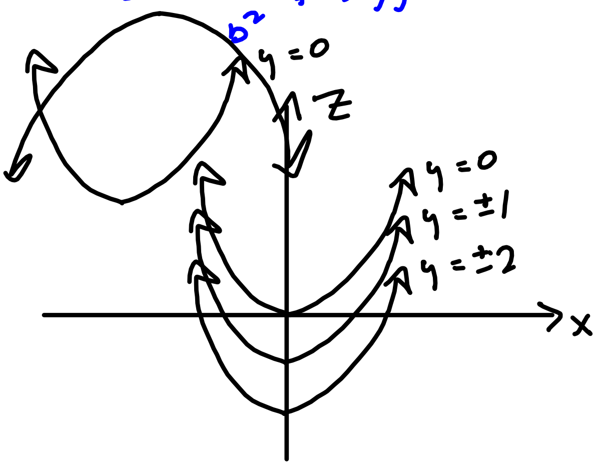
$$z = -\frac{y^2}{b^2}$$

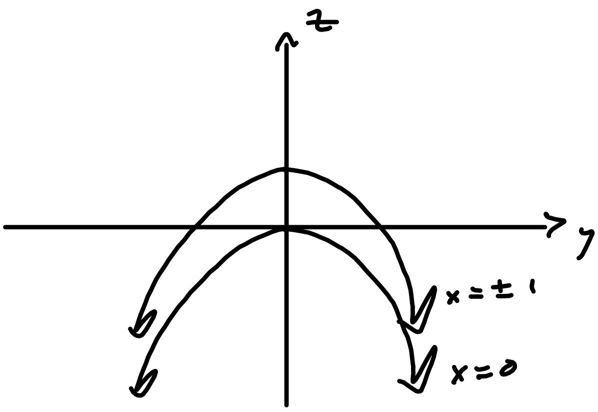


$x = \pm 1$

$$z = -\frac{y^2}{b^2} + \text{bigger}$$

Slices / traces parallel to yz-plane, (i.e., $x = \text{constant}$)



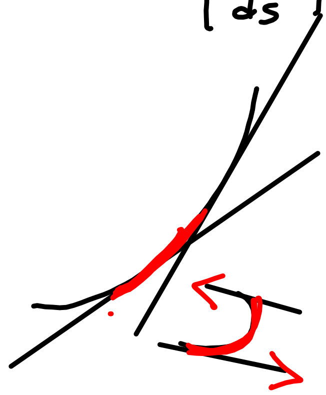


$\overline{T}$ = unit tangent vector

$= \dfrac{1}{|\overline{r}'|}\,\overline{r}'$

Curvature :

κ = curvature $\doteq \left|\dfrac{d\overline{T}}{ds}\right|$



Assume $s = s(t)$ = arc length as a function of t

$\therefore$ s is an invertible function, so that

$t = t(s) =$ 't of s'

Then $\left|\dfrac{d\overline{T}}{ds}\right| = \left|\dfrac{\frac{d\overline{T}}{dt}}{\frac{ds}{dt}}\right|$ *

Chain rule, viewing $\overline{T}$ as funct of t and t as func of s.

$$\frac{d\overline{T}}{dt} \overset{\text{chain}}{=} \frac{d\overline{T}}{ds}\cdot\frac{ds}{dt}$$

Can do

$$\kappa(t) = \left|\frac{d\overline{T}}{ds}\right| = \left|\frac{\frac{d\overline{T}}{dt}}{\frac{ds}{dt}}\right| = \boxed{\frac{|\overline{T}'(t)|}{|\overline{r}'(t)|}}$$

T10

Can do

$$s = \int_\alpha^\beta ds = \int_\alpha^\beta \sqrt{f'^2 + g'^2 + h'^2}\,dt$$

$\underline{\overline{r}' \times \overline{r}''}$

$$= \left| \frac{}{|\bar{r}'|^3} \right| =$$

STUFF they left out of T10 proof.

"Since $\bar{T}$ is $\perp$ to $\bar{T}'$"

why? $\bar{T}'$ is of length 1