§12.6 #s ? Assigned yet?

§13.1 #s 1, 3, 4, 7, 10, 13, 15, 18, 21–27, 31, 33

§13.2 #s 2, 3, 7, 10, 11, 14, 19, 20, 23, 32, 37, 41, 53

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§12.6 – Work on graphing chops (Practice)

Master the TABLE!

MAPLE STATUS?

CHECK YOUR E-MAIL

$x^2+y^2+z^2=9$

$x=0$ yz-plane

$x=1$ ∥ to yz-plane

$x=2$ " " "

$x=3$ " " "

$y^2+z^2=9$

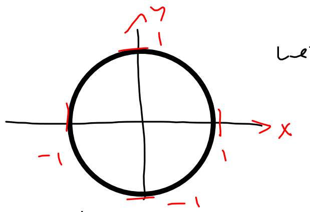
$1^2+y^2+z^2=9$

$y^2+z^2=8$

$x=k$:

$y^2+z^2=9-k^2$

$x^2+y^2=1$ & $y+z=2 \longrightarrow z=y-2$



Projection of intersection into the xy-plane.

Let $x=\cos(t)$
$y=\sin(t)$
$z=2-\sin(t)$

$\bar{r}(t)=\langle \cos(t), \sin(t), 2-\sin(t) \rangle$

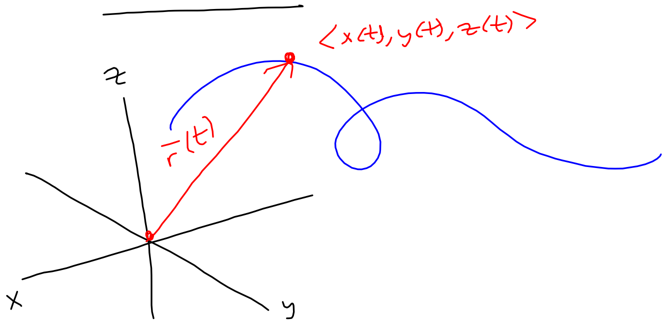
Parametrization of their intersection.

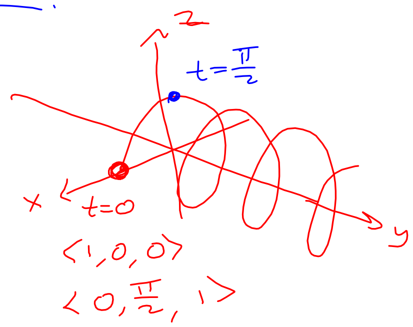
§13.1 Space Curves

$\bar{r}(t)=\langle \cos(t), t, \sin(t) \rangle$

$x^2+z^2=1$ circle of radius 1 in projection in xz-plane.

Maple Status — Get student version!





$\bar{r}(t) = \langle x(t), y(t), z(t) \rangle$

$\bar{r}'(t) = \langle x'(t), y'(t), z'(t) \rangle$

Find eq'n of tangent line to

$\bar{r}(t) = \langle \cos(t), t, \sin(t) \rangle$ @ $(0, \frac{\pi}{2}, 1)$

$\bar{r}'(t) = \langle -\sin(t), 1, \cos(t) \rangle$

$\bar{r}'(\frac{\pi}{2}) = \langle -1, 1, 0 \rangle$

Line thru $(0, \frac{\pi}{2}, 1)$ in the direction $\langle -1, 1, 0 \rangle$

$\overline{Tan} = \langle 0, \frac{\pi}{2}, 1 \rangle + t \langle -1, 1, 0 \rangle$

$x = 0 - t,\ y = \frac{\pi}{2} + t,\ z = 1$

$\overline{Tan}(t) = \langle -t, \frac{\pi}{2} + t, 1 \rangle$

$\bar{T}(t)$ = unit tangent to $\bar{r}$

$$\bar{T}(t) = \frac{\bar{r}'(t)}{\|\bar{r}'(t)\|}$$

$\bar{r}(t) = \langle \cos(t), t, \sin(t) \rangle$

$\bar{r}'(t) = \langle -\sin(t), 1, \cos(t) \rangle$

$\|\bar{r}'(t)\| = \sin^2(t) + 1 + \cos^2(t) = 2$

$\bar{T}(t) = \frac{1}{2}\langle -\sin(t), 1, \cos(t) \rangle$

$\bar{N}$ = Normal = $\frac{\bar{T}'}{\|\bar{T}'\|}$

$\bar{B}$ = Binormal = $\bar{T} \times \bar{N}$

Read your §'s 13.1, 13.2

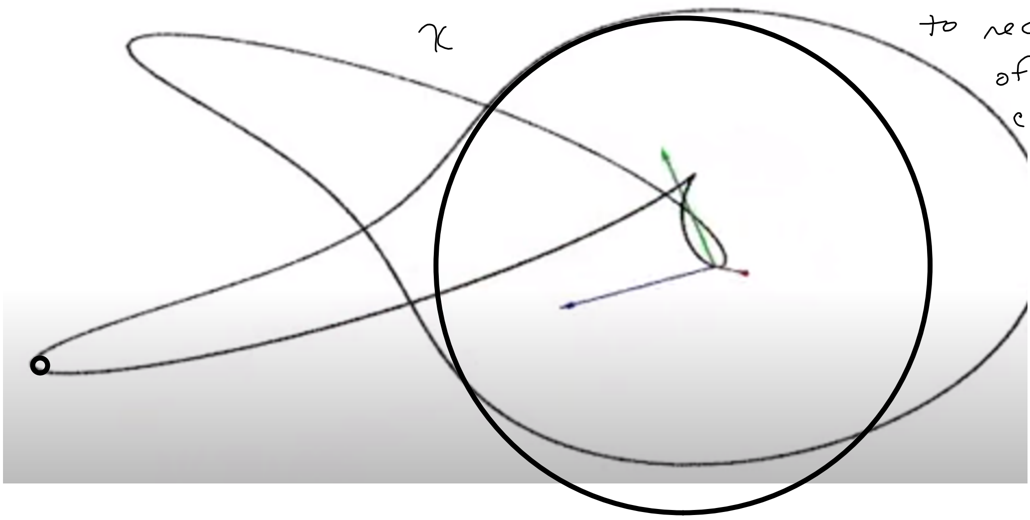
$\|\bar{B}\| = \|\bar{T} \times \bar{N}\| = \|\bar{T}\|\|\bar{N}\| \sin\theta = 1$

$\bar{T}'$ is $\perp$ $\bar{T}$

TNB-Frame for space curves!

See Curvature κ κ = kappa is related to reciprocal of osculating circle.

κ



Any Homework Questions?

§12.6 #s 1, 2, 3, 5, 8, 9, 11, 13, 16, 19, 21-28*, 31-37☆

*I'll flip you the pictures.

$ I'll send the rest, shortly.

☆ Do at least one, a detail.

Integration and Differentiation behave just as we would hope.

$\bar{r}(t) = \langle x(t), y(t), z(t) \rangle$

$\bar{r}'(t) = \langle x'(t), y'(t), z'(t) \rangle$

$$\int \bar{r}(s)ds = \langle \int x(s)ds, \int y(s)\,ds, \int z(s)ds \rangle$$

Big deal: Arc Length & Arc length Increment for integrals.

Increment of Arc Length:

$$ds = \sqrt{x'(t)^2 + y'(t)^2 + z'(t)^2}\,dt$$

$$= \|\bar{r}'(t)\|\,dt$$

Write it, now. More on this, later.