

restart :

with(Student[VectorCalculus]) : with(linalg) :

alpha := <2\*cos(t), 2\*sin(t), t>

$$2 \cos(t)e_x + 2 \sin(t)e_y + (t)e_z$$

(1)

a := TangentVector(alpha) : a1 := TangentVector(alpha, output = plot) :

b := PrincipalNormal(alpha) : b1 := PrincipalNormal(alpha, output = plot) :

$P_0 := \text{subs}\left(t = \frac{\text{Pi}}{2}, \text{alpha}\right) :$

$T_1 := \text{subs}\left(t = \frac{\text{Pi}}{2}, a\right) :$

$N_1 := \text{subs}\left(t = \frac{\text{Pi}}{2}, b\right) :$

vectorN := CrossProduct(T1, N1)

$$\begin{bmatrix} \frac{2}{5} \sqrt{5} \\ 0 \\ \frac{4}{5} \sqrt{5} \end{bmatrix}$$

(2)

planoosculador := innerprod([x, y, z] - P0, vectorN)

$$\frac{2}{5} x \sqrt{5} + \frac{4}{5} \sqrt{5} z - \frac{2}{5} \sqrt{5} \pi$$

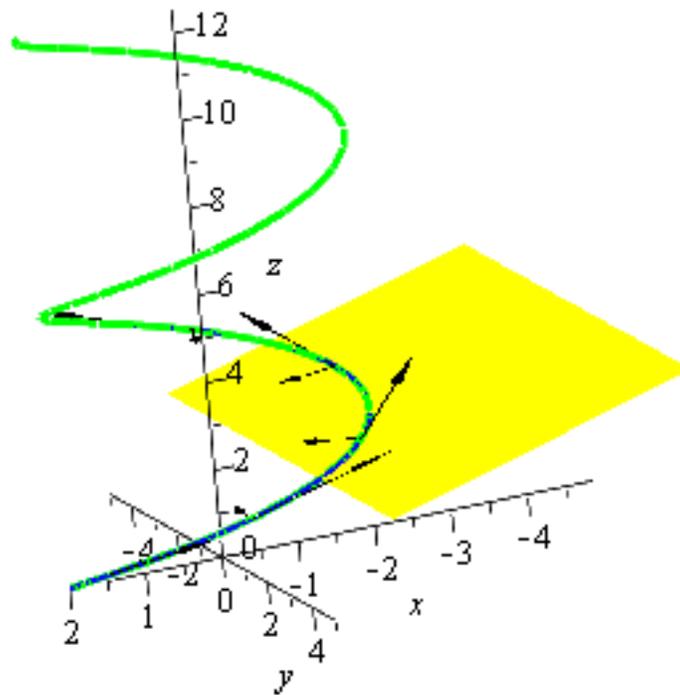
(3)

with(plots) :

curva := spacecurve(alpha, t = 0 .. 4\*Pi, color = green, thickness = 3) :

plano := implicitplot3d(planoosculador = 0, x = -5 .. 5, y = -5 .. 5, z = 2 .. 4, color = yellow, style = surface) :

display(curva, plano, a1, b1, axes = normal)



Ejercicio.-Realizar las rutinas anteriores con las siguientes curvas

$$c_1 := \langle \cos(t), \sin(t), 4 \cos^2(t) \rangle :$$

$$c_2 := \langle 2 \sin(t) \cos(3t), t \rangle :$$

$$c_3 := \langle 2 \cos(t), 2 \sin(t), 4 \cos(t) + 1 \rangle :$$

Es decir grafica la curva los planos osculador, normal y rectificador

Error, (in plots:-display) cannot display array with other plots