```
restart :
with(Student[VectorCalculus]) : with(linalg) :
alpha := ⟨2·cos(t), 2·sin(t), t⟩
```

$$2\cos(t)e_x + 2\sin(t)e_y + (t)e_z \tag{1}$$

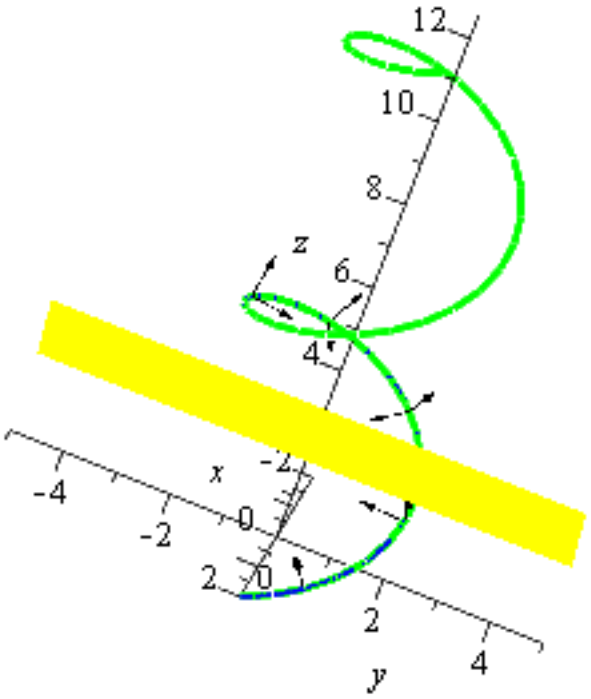
```
a := PrincipalNormal(alpha) : a1 := PrincipalNormal(alpha, output = plot) :
b := Binormal(alpha) : b1 := Binormal(alpha, output = plot) :
P0 := subs(t = Pi/2, alpha) :
N1 := subs(t = Pi/2, a) :
B1 := subs(t = Pi/2, b) :
vectorN := CrossProduct(N1, B1)
```

$$\begin{bmatrix} -\frac{8}{25}\sqrt{5} \\ 0 \\ \frac{4}{25}\sqrt{5} \end{bmatrix} \tag{2}$$

```
planorectificador := innerprod([x, y, z] − P0, vectorN)
```

$$-\frac{8}{25}x\sqrt{5} + \frac{4}{25}\sqrt{5}\,z - \frac{2}{25}\sqrt{5}\,\pi \tag{3}$$

```
with(plots) :
curva := spacecurve(alpha, t = 0..4·Pi, color = green, thickness = 3) :
plano := implicitplot3d(planorectificador = 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, graficas los vectores Tangente, Normal y Binormal, asi como el circulo osculador la curvatura y la torsion

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