a) Find all values of b for which the vectors <2,1,0> and <0,b,1-b> are orthogonal
2*0+1*b+(1-b(0)), **b=0**
b) Compute the cross product of
c) When v is a nonzero vector, describe geometrically what vectors w satify. v.w=-|v||w| **when v is nozero, w may be nonzero, cos=-1, theta=pi**
a) Express <4,-2> as a linear combo av+bw, v=<1,1> w=<0,1>
1a+0b, 1a+1b, a=4, b=-6, **4v-6w**
b) Give an example showing u.v=u.w where v is not w
<0,1,0>.<2,2,0>=<0,1,0>.<5,2,3>
a) cylindrical to rectangular (5,pi,4)
(5cosπ,5sinπ,4)
b)rectangle to spherical (4,0,4)
(4√2,0,π/4)
c)find radius and center of sphere ρ=10cosΦ by going to Cartesian coordinates.
Radius 5 center (0,0,5)
a)parameterize the tangent line <cost,-3t^3,e^t> at t=0
r(0)=<1,0,1> r'(0)=<0,0,1> **<1,0,1>+t<0,0,1>**
b) parameterize the curve of intersection between x^2+z^2=4 and y=3x^2
circle or radius 2, x=2cost z=2sint y=3x^2=12cos^2 t **r(t)=<2cost,12cos^2 t,2sint>**
a)Find a vector parallel to intersection of planes y+z=0 and x-2y=3
n1 x n2=<0,1,1>x<1,-2,0>=<2,1,-1>
b)find an equation containg (6,2,4) and <2-t,3,4+t>
I j k
-1 0 1
4 -1 0 -(6-2,2-3,4-4 **x+4y+z=18**
Compute length of one twist of helix <3cos2t,-3sin2t,4t> 0<=t<=π
$integral\ from\ 0\ to\ \pi\ of\ \sqrt{(-6sin2t+6cos2t+4)^2}$=√52=√52π
Calculate f'(c(t)) at t=π, where f(x,y)=x^2-2x+y^2+1,c(t)=(sin3t+1,cos3t)
<2x-2,2y>.<3cos3pi+1,-3sin3pi>=**2(3cos3pi+1)-2*2(-3sin3pi)=0**
a)find fxyx for f(x,y,z)=y^3 e^(3yz) + xy^2/z^3 + 6x^2 y
dx, dy, dx = 12
b) Calculate the direc. Deriv. in the direction <1,2,2> at point (1,0,-1)
f(x,y,z)=xz^2 e^y
fx,fy,fz at point is <1,1,-2> unit vector=1/√9 = 1/3, 1/3*<1,1,-2>*<1,2,2>=<1/3,2/3,-4/3)=-1/3
Find the cp of the function. Max, min, saddle points
Fx= x^2 – y, Fy= -x+2y, x=2y, 0=(2y)^2 – y, y=0,1/4,x=0,1/2 D=fxxfyy-fxy^2=(2x)(2)-(-1)^2 =4x-1 D(0,0)=-1<0 s.p. D(1/2,1/4)=1>0 and fxx=1>0 so local min.
D>0=(fxx>0 local min, <0 local max) D=0=ind. D<0=saddle
Find the abs. max of f(x,y)=xy-5 on x^2+4y^2<=200
0=fx=y, 0=fy=x, (0,0) c.p x^2+4y^2=200, <y,x>=λ<2x,8y>
y=λ2x, x=λ8y, x^2+4y^2=200, y=+-5, x=+-10 check (0,0)(10,5)(10,-5)(-10,-5)(-10,5) max = (10,5)(-10,-5)
Use a tangent plane to estimate the value (2.01)^2 √24.95