Dynumics Assignment,
V
a) Vorb = A Unef,
from figure 4, we rotate firstly around the se ossis. by the angle I, such
the se ossis. by the angle I, such
thert,
(100)
T'= O COST SINT T
-A = 1200 Emil- 0
then it is rotated around the new z-assis
with un angle a.
Such Hut, Aw
" (Costo Sintu O)
S = (Sinow Coscu o) I.
\ 0 0 1/
The state of the s
6 0' = COSW SINW O 100
-Since coscu o o Gost sint !
(0 0 1 / 0 -sin) cost/
= (cos w sinw cos I sinwsin I,
-Sinw Coscuces I Coscusin I
O - Sin I COS I
CONTROL OF A CONTROL OF THE CONTROL
$A = A \omega A \tau$

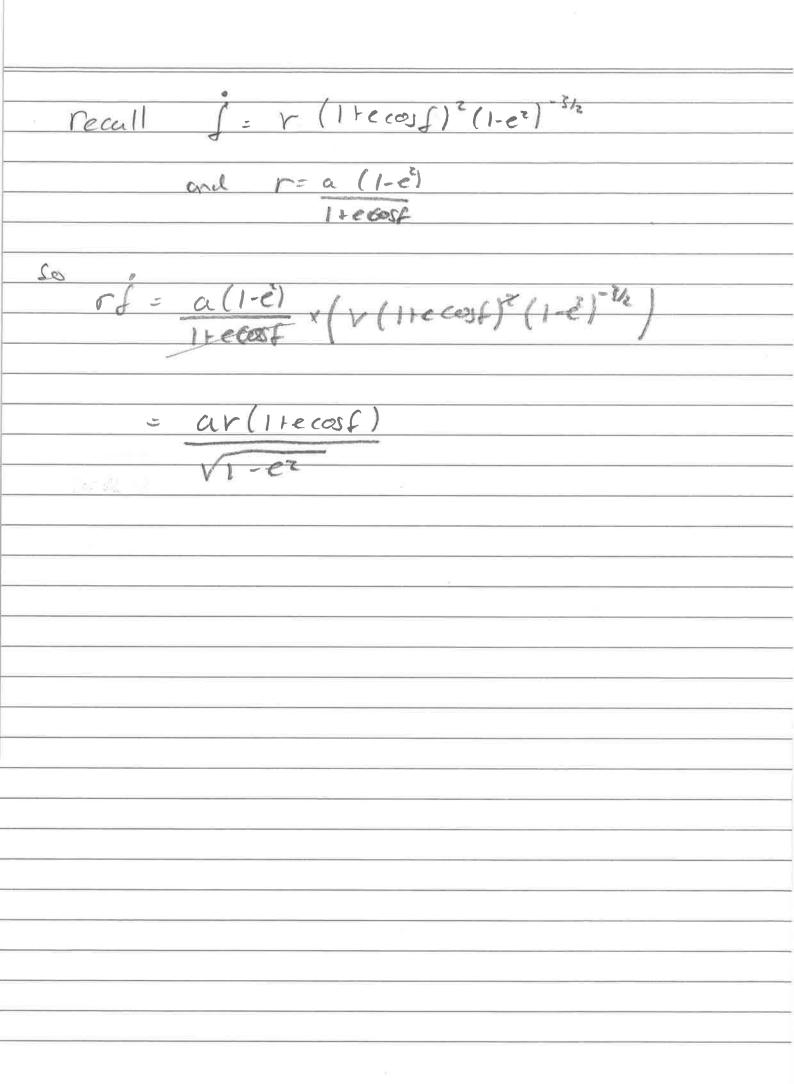
Let uref = { De, , y, , Z, }, So | Urefl = De, 2 + 43 +5.3 Vorb - A Uref. = { z. Cosw + y. Cosi sinw + Z, Sini sinw, y, cosi cosusta, cosusini - x, since, Z, cose - y, sini } now loorbl? = 20,3(05'(w) +4,2 (05'i sin'w + 2,3 sin'i sin'w. + Zx, y, cos w cosc sin w + Zx, z, cos w sin i sin w. + 24, Z, Cosi Sini Sini w. + y, cost cost + Z, costusini + xq sin costusini sinu = 2 x, y, Cosi cos cos sincus. + Z, 2 (05° i + y, 2 sin i - 24, 7, Cosisini now group ou.r.t xi, yi, zi, z, z, z, z, y, , xi, y, = X, 2(cos w + sin w) + y, 2(cos i si 2 cos + (os i cos w + sin i) + Z, 2 (sin i sin w + cos w sin i + cos i) + 2x, y, (o) + 2x, z, (o) + 2y, z, (cosi sin i sin i w - Cosi sini)

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= 20,2 + 4,2 ( cos cisin'w + cosic cosic + shirt)
         + 212 ( Sin i Sinze + cos co sin i + cos i)
         + 24, Z, (Cosi sini sinico + Cosi sinilos a
                    - cosisini)
               = Cosi sini (sin'au + cosiau) - cosi sini = 0
 Cosicin w + cosicos w + sinci.
   = cos? i (sin? w + cos? w + sin? ) = cos? i (1 + in?)
(Singi singer colorsingi + cossi)
  = Sinii + Cosii = 1
.. 1000+13 = x, 3 + 43 + 53 .
6) ii). Voef = x., y., Z. Wpey = (x, y2, 2)
    So. Uref. Wret = 20,202 + 9,42 + 2,25
  Wref = { x = Coscery = Cosisinw + Zz sini since,
           Yz cosi cosa + Zz cosa sini - Zz sina,
           Zz Cosi - yz sinis
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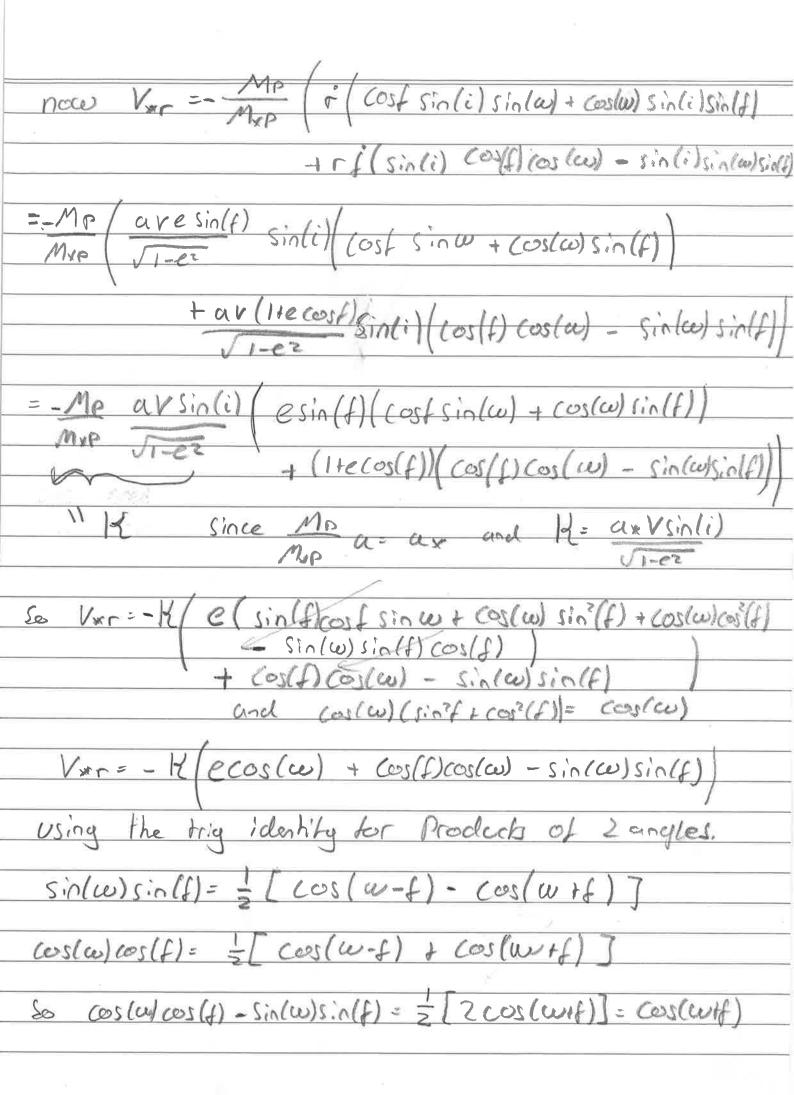
Ooch . Work = (Z, Z, Cosi + x, x, Cosiw + y, y, Cosi Cosiw - y2Z, Cos è sin e - y, Zz Cos è sini + y z, los è cos cusine + y, Z, Cosi cos w sini + y, y, sini + Z, Z, Cosw sin'i + xxx sin w + y, y2 cos i sin w + 42 Z, los i sin i si + 4, Zz cosúsini sinecu + Z, Zz sině sinecu group all sex, to get. ICIZ2 (cos2 w + sin2w) + Z1 Z2 (cos2 + Cosw2 sin2 + sin2 i sin2cu) + 4.45 (cossi conson + singi + cossi singen + YzZI (Cosi Cosi cosini - cosisini + cosisini sinico) + y, Z2 (- cosi sini + cosi coso sini + cosi sini sin'eu) Where, Cosit Coswishich + sini i sini co = cosi + sini(1)=1, simmilarly for Costi Cost u +sinti + costi sinte and. Cosilos wsini + cosi sini sino - cosisini = Cosisini (cos'w +sin w) - cosisini = 0. So vorb. work = DC, DC, Ty, yo + 3, Zz = Upof comf. also since vort-work = |Vort | work | cos(o) = | Uref | wpepl implies that he argle is conservered,

between vectors since |voith-lune/1

c) r= a(1-e2) = a(1-e2)(1+ecosf)-1 So d r= r = a(1-e2) d (1+ e cosf)-1 = a(1-e3) esin(f) (1+c cosf) = f = alleez) e sin(f) ; now rij = aivvi-er => f = aivvi-er and $r^2 = a^2 (1-e^2)^2$ So f = a vv1-ez (1+ecosf)2 V(1+ecosf)2 VI-ez
(1-c2)2 noce $\sqrt{1-e^2}$ $(1-e^2)^{\frac{1}{2}}(1-e^2)^{\frac{2}{2}} = (1-e^2)^{\frac{-3}{2}}$ 30 r = a(1-e2) esin(f) y(1+00sf)2 (1-e2)-3/2 = cur(1-e2) 1/2 esin(f) = avesin(f)



D) The velocity of the ster is defined as
Vx Mp : where V=rer + rf es.
Vx Mp ; where V= rer + rf ef.
· · V = (+ cos(f) - rfsin(f)) i" + (rsin(f) + rfcodf) j"
+(0)K''
Since the orbit rotates in the x'-y" Plane,
in order to calculate the radial velocity.
we need to all a series I . I to all
the observer with the predefined Matrix A,
The Objects with the predefined Marix A,
Since Vorb = A Vref
AT Vorb = ATA Dref = Dref
Vref = (cos(w) -sin(w) 0 rcost -rf sin(f)
cos(i) sin(a) cos(i)cos(a) -sin(i) +sin(f)+rf(os(f)
Sin(i)sin(w) cos(w) Sin(i) cos(i)
1 0 11 (1) 2 11 (10) CESTED 1 (10)
One the moderal Molocities is closer the Z and of the
Since the radial velocity is along the Zaxis of the observer's Frame:
CUSIVE) France.
V = (/ 1/10 / 1/2
Vr = Sin(i) Sin(co)(r cosf -rfsin(f) +
Cos(w)sin(i) (rsin(f) +rfcos(f) +0
1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
where is ar esinf and of av (1+e cosf)
V1-e2



and,
Vxr=-K[ecos(ce)+ Los(ce)+J.
now recall that w-wp-w-TT
and f=fp=fx.
we get,
V=r=-14 [e cos(w=-17) + (os(w=+f=)-17)]
Kt-e Coslew) - coslew+fol]
= Klecos (cex) + (os (cex +fa)]
THE COS CONFIANCE
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