Force analysis via dyad

{AB → 0.14, AC → 0.06, CF → 0.2, h → 0.01, d → 0.01, hSlider → 0.02, wSlider → 0.05,
 ro → 8000, g → 9.807, Me → 1000., phi[t] → 1.0472, phi′[t] → 9.8696, phi″[t] → 0}

Inertia forces and moments

Link 1

m1 = ro AB h d = 0.112 [kg]

IC1 = m1 (AB^2+h^2)/12 = 0.000183867 [kg m^2]

Fin1 = -m1 aC1 = {0.381844, 0.661373, 0} [N]

F1 = Fin1 + G1 = {0.381844, -0.437011, 0} [N]

Min1 = M1 = -IC1 alpha10 = {0, 0, 0} [N m]

Link 2

m2 = ro hSlider wSlider d = 0.08 [kg]

IC2 = m2 (hSlider^2+wSlider^2)/12 = 0.0000193333 [kg m^2]

Fin2 = -m2 aC2 = {0.545491, 0.944818, 0} [N]

F2 = Fin2 + G2 = {0.545491, 0.160258, 0} [N]

Min2 = M2 = -IC2 alpha20 = 0 [N m]

Link 3

m3 = ro CF h d = 0.16 [kg]

IC3 = m3 (CF^2+h^2)/12 = 0.000534667 [kg m^2]

Fin3 = -m3 aC3 = {3.30266, 1.02997, 0} [N]

F3 = Fin3 + G3 = {3.30266, -0.539153, 0} [N]

Min3 = M3 = -IC3 alpha30 ={0, 0, -0.0467673} [N m]

M3e = -Sign[omega2]{ 0, 0, Me } = {0, 0, -1000.} [N m]

Joint reactions

Dyad: B_R, B_T, C_R

Sum F for 2 & 3: F03 + F3 + F2 + F12 = 0

(x): 3.84815 + F03x + F12x=0 (1)

(y): -0.378895 + F03y + F12y=0 (2)

Sum M for 2 & 3 wrt B: rBC x F03 + rBC3 x F3 + M3 + M3e + M2 = 0

(z): -1000.06 + 0.0612436 F03x - 0.07 F03y=0 (3)

Sum F for 3 projected upon BC: (F03+F3).rBC = 0

-0.07 (3.30266 + F03x) - 0.0612436 (-0.539153 + F03y)=0 (4)

From Eqs.(1)(2)(3)(4) => F03x, F03y, F12x, F12y

F03 = {F03x, F03y, 0} = {7078.4, -8093.69, 0} [N]

F12 = {F12x, F12y, 0} = {-7082.25, 8094.07, 0} [N]

Link 2

Sum F for 2: F32 + F2 + F12 = 0 <=> F32 = - F2 - F12

F32 = {7081.71, -8094.23, 0} [N]

Sum M for link 2 wrt C2(B): BQ x F32 + M2 = 0 & M2=0 => rQ=rB

Link 1

Sum F for link 1: F1 + F21 + F01 = 0 <=> F01 = - F21 - F1

F01 = {-7082.63, 8094.51, 0} [N]

Sum M for 1 wrt C1: C1B x F21 + C1A x F01 + M1 + Mm = 0 <=>

Mm = - (C1B x F21 + C1A x F01 + M1)

Mm = {0., 0., 1425.3} [Nm]