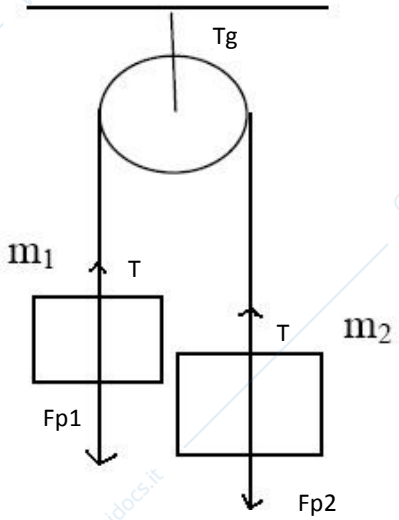
Dinamica es 1



m1:

T1+Fp1=m1*a1

Tenendo conto del SdR:

Fp1-T1=m1*a1
m1*g-T1=m1*a1

m2:

T2+Fp2=m2*a2

Tenendo conto del SdR:

Fp2-T2=m2*a2
m2*g-T2=m2*a2

T1=T2=T
A1=a2=a

m1*g-t=m1*a
M2*g-T=m2*a

T=m1(g-a)
M2*g-m1(g-a)=m*a

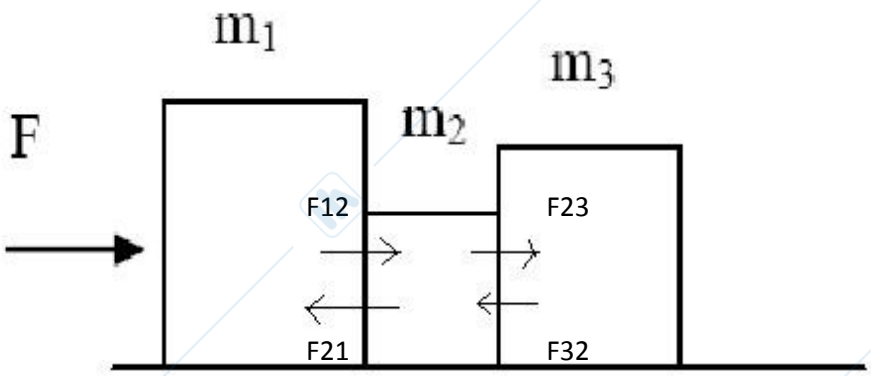
T=m1(g-[(m1-m2)/(m1+m2)]g)=2*[(m1*m2)/(m1+m2)]g
a=[(m1-m2)/(m1+m2)]g

Tg+T+T=0

Fg=2*Tg=4*[(m1*m2)/(m1+m2)]g

a)a=[(m1-m2)/(m1+m2)]g
b)T=m1(g-[(m1-m2)/(m1+m2)]g)=2*[(m1*m2)/(m1+m2)]g
c)Fg=2*Tg=4*[(m1*m2)/(m1+m2)]g

Dinamica es 2



m1=45.2 Kg
m2=22.8 Kg
m3=34.3 kg
a=1.32 m/s2
F12=F21
F23=F32

a) F=(m1+m2+m3)*a=135N

F23=m3*a
F12+F32=m2*a
F+F21=m1*a

tenendo conto del SdR
F23=m3*a
F12-F32=m2*a
F-F12=m1*a

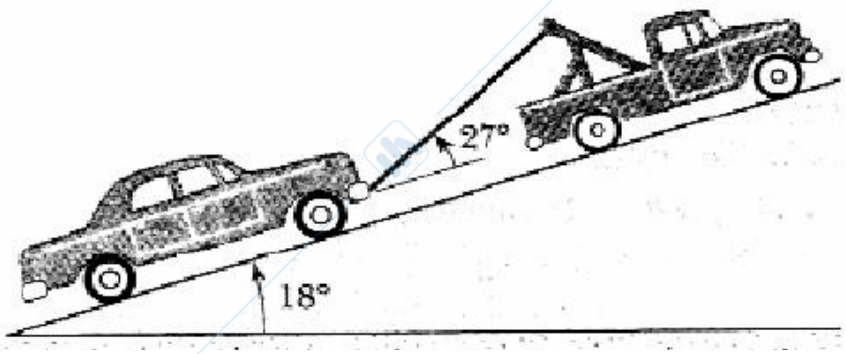
F23=m3*a
F12-m3*a=m2*a
F=-(m2+m3)a=m1*a

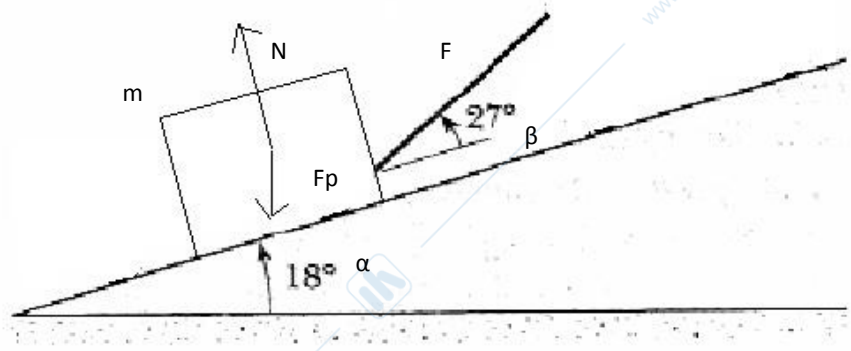
F12=a(m2+m3)
F=(m1+m2+m3)a

b)F23=m3*a=45.276 N

c)F12=a(m2+m3)=75.372 N

dinamica es 3





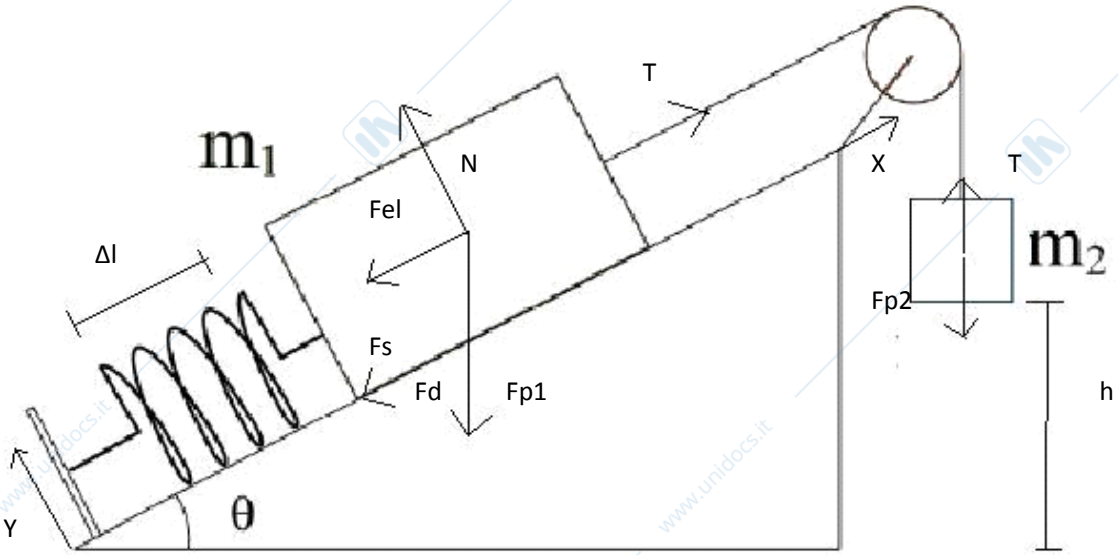
m=1200 Kg
α=18°
β=27°
carico di rottura del cavo=4.6 kN
vuol dire che la Fmax=4.6 kN
Fp=m*q

m*a=-Fp*sinα+Fcosβ a=(Fcosβ-Fp*sinα)/m

S(t)=1/2a*t^2

dinamica es 4

sabato 17 aprile 2010
9.58



m1=2 Kg
m2=3 Kg
θ=30°
Kel=30 N/m
Δl=0.5 m
h=10 m
μd=0.3

IN EQUILIBRIO

a) Fe=Kel*Δl
Fs=N*μs
Fp1=m1*g
Fp2=m2*g

m2:
Fp2-T=0
T=m2*g

m1:
X: T-Fe-Fs-Fpsinθ=0
Y: N-Fpcosθ=0

m1*g*cosθμs=m2*g-Kel*Δl-m1*g*sinθ
N=m1*g*cosθ

μs=(m2*g-Kel*Δl-m1*g*sinθ)/m1*g*cosθ

b) TOLGO LA MOLLA
quindi non c'è più Fel e, visto che il sistema non è più in equilibrio si tiene conto di Fd al posto di Fs

Fd=N*μd

m2:
Fp2-T=m2*a
m2*g-T=m2*a
T=m2(g-a)

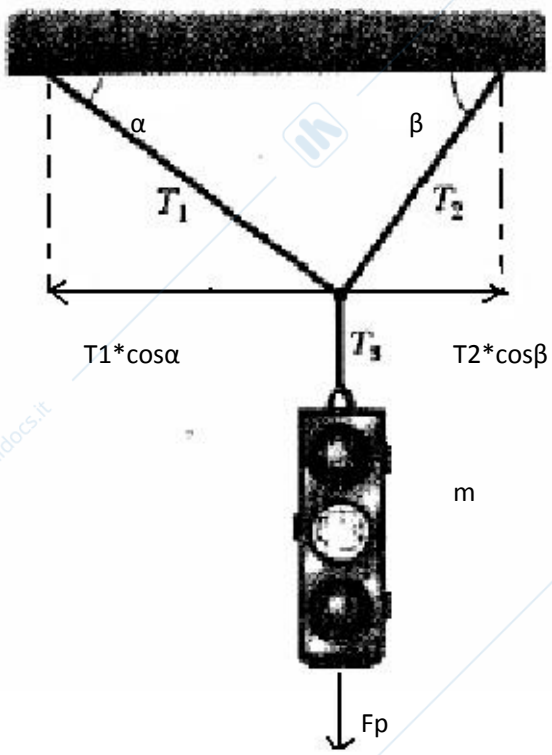
m1:
X: T-Fe-Fs-Fpsinθ=m1*a
Y: N-Fpcosθ=0

N=m1*g*cosθ

m2(g-a)-Kel*Δl- m1*g*cosθμdm2*g-m1*g*sinθ=m1*a
m2g-Kel*Δl- m1*g*cosθμdm2*g-m1*g*sinθ=(m1+m2)*a
a=(m2g-Kel*Δl- m1*g*cosθμdm2*g-m1*g*sinθ)/(m1+m2)=2.90 m/s^2

h=1/2*a*t^2 t^2=2*h/a t=2.63 s

dinamica es 5



α=37°
β=53°
m=12.74 Kg

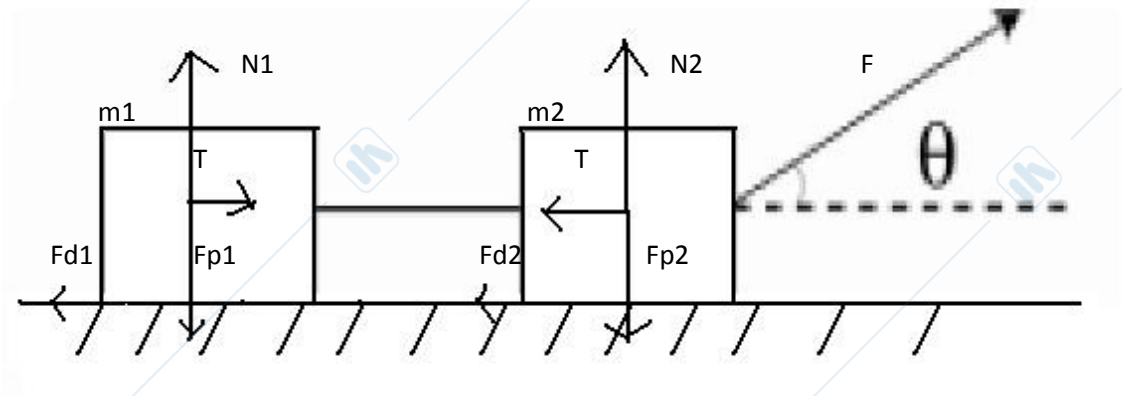
T3-Fp=0 T3=m*g=125 N

X: -T1*cosα+T2*cosβ=0
Y: T1*senα+T2*senβ=T3

T1=(T2*cosβ)/cosα
(T2*cosβ/cosα)*senα+T2*senβ=T3

T2=T3/((cosβ*senα/cosα)+senβ)=99.8 N
T1=75.2 N

dinamica es 6



m1=5 Kg
m2=10 Kg
θ=30°
μd=0.45
F=100 N

Fd1=μd*N1
Fd2=μd*N2

m1:

X: m1*a=T-Fd1 m1*a=T-m1*g*μd T=m1(a-g*μd)
Y: N1-Fp1=0 N1=Fp1=m1*g

m2:

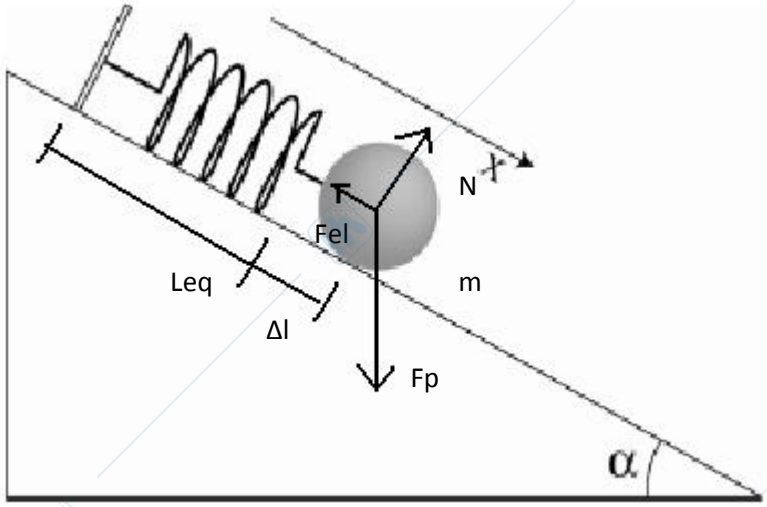
X: m2*a=F*cosθ-T-Fd2 m2*a=F*cosθ-T-(m2*g-F*sinθ)*μd
Y: N2+F*sinθ-Fp2=0 N2=m2*g-F*sinθ

m2*a=F*cosθ-T-(m2*g-F*sinθ)*μd
T=m1(a-g*μd)

m2*a=F*cosθ-m1(a-g*μd)-(m2*g-F*sinθ)*μd
(m1+m2)*a=F*cosθ+m1g*μd-(m2*g-F*sinθ)*μd
a=(F*cosθ+m1g*μd-(m2*g-F*sinθ)*μd)/(m1+m2)=2.86 m/s^2

T=36.4 N

dinamica es 7



α=40°
Kel=500 N/m
m=5 Kg
Δl=10 cm
Fel=L*Kel
Fp=m*g

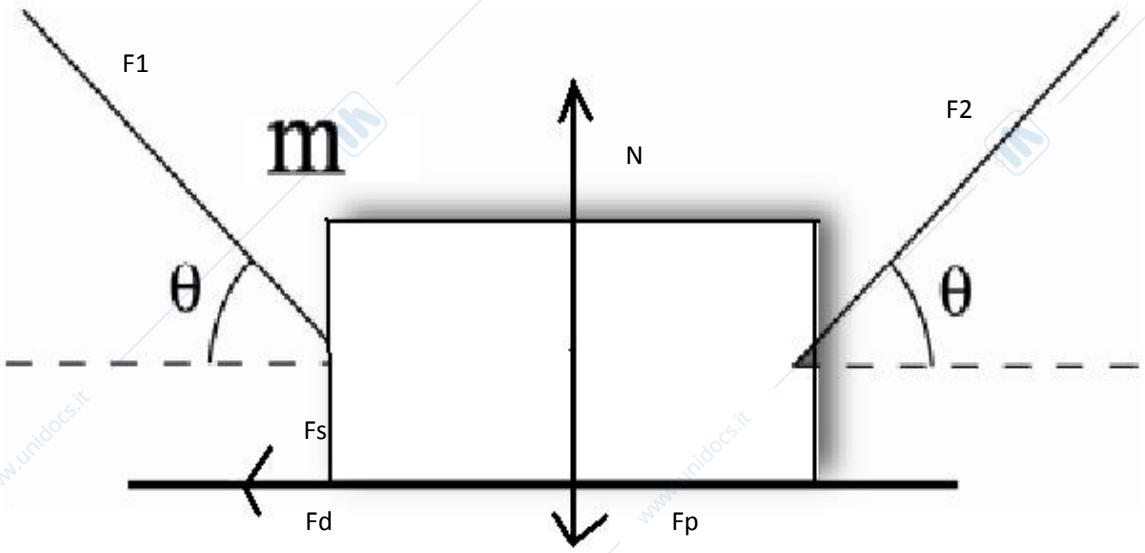
a) SISTEMA IN EQUILIBRIO => a=0

Fel-Fp*senα=0 Leq*Kel=m*g*senα Leq=(m*g*senα)/Kel

b) molla in posizione Leq+Δl

dinamica es 8

θ=60°
μs=0.45
μd=0.35
Fp=m*g
Fd=N*μd



a) scopro la forza più conveniente

F1:

X:F1*cosθ-Fs=0
Y:N-Fp-F1*sinθ=0

F1*cosθ-(F1*sinθ+m*g)*μs=0
N=m*g+F1*sinθ

F1*(cosθ-sinθ*μs)=m*g*μs
F1=(m*g*μs)/(cosθ-sinθ*μs)=1199.6 N

F2:

X:F2*cosθ-Fs=0
Y:N-Fp+F2*sinθ=0

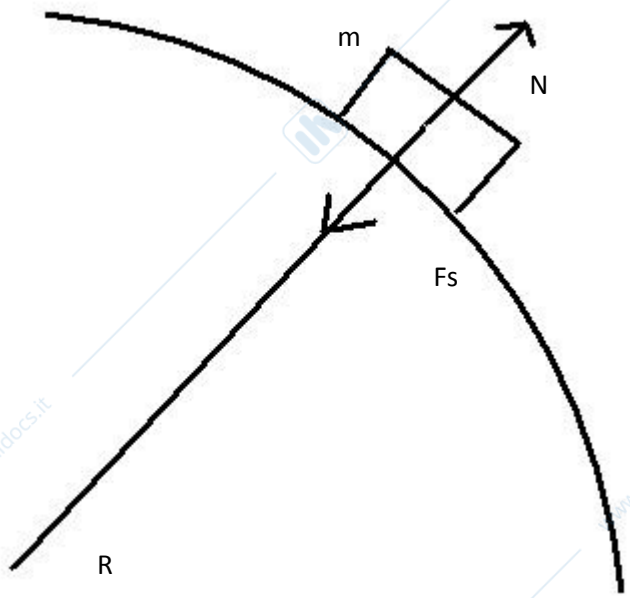
F2*cosθ-(-F2*sinθ+m*g)*μs=0
N=m*g-F2*sinθ

F2*(cosθ+sinθ*μs)=m*g*μs
F2=(m*g*μs)/(cosθ+sinθ*μs)=148.7 N

b) lavoro L per spostare la cassa di Δl

L=F*Δl=1487 J

dinamica es 9



m=1500 Kg
R=35 m

N=(V^2/R)*m
Fs=μs*N

a) SISTEMA IN EQUILIBRIO => a=0

μs=0.5
V=?

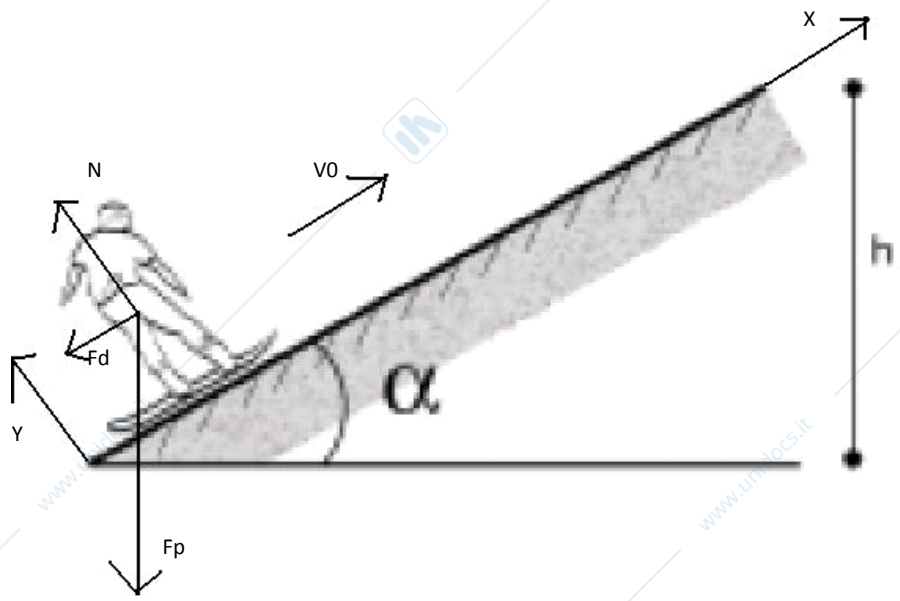
m*V^2/R-μsm**g=0 V^2=μs*R*g V=13.1 m/s

b) Vmax=8 m/s
μs=?

V^2=μs*R*g μs=v^2/(R*g)=0.19

dinamica es 10

V0=20 m/s
μd=0.2
α=15°
Fd=N*μd
Fp=m*g



a) LEGGE ORARIA

X: m*a= -Fd-Fp*senα m*a=-μd*m*g*cosα-m*g*senα
Y: Fp*cosα=N a=-g(senα+μd*cosα)

S(t)= V0*t+1/2a*t^2 S(t)=V0*t-1/2*g(senα+μd*cosα)*t^2

b) altezza massima hmax e tempo t necessario per raggiungerla
si ha altezza massima quando V(t)=0

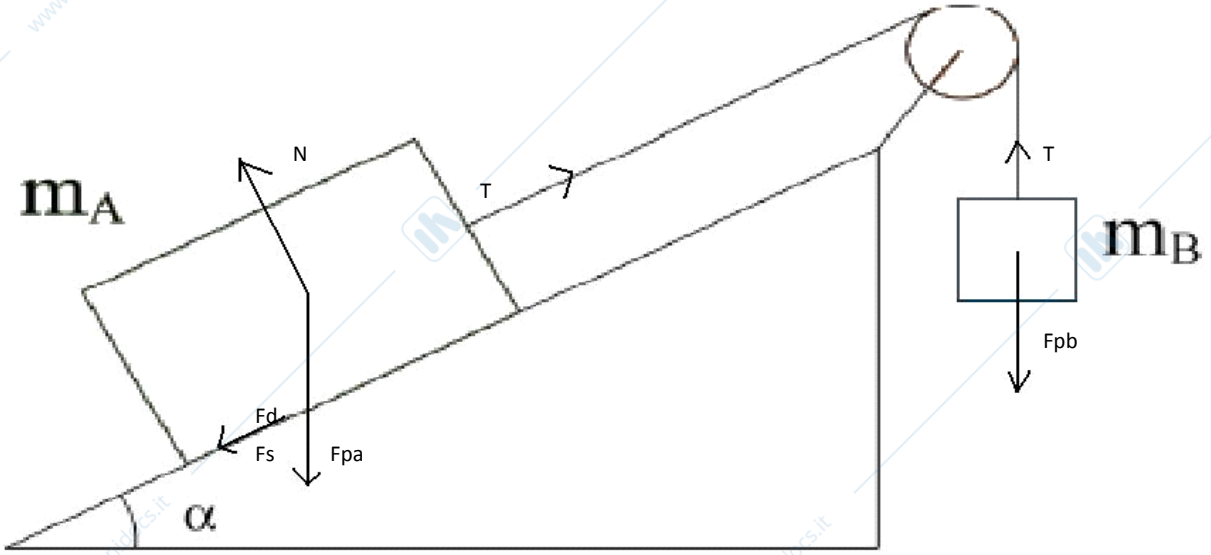
V(t)=dx/dt V(t)=V0-g(senα-μd*cosα)*t

V0-g(senα-μd*cosα)*t=0 t=V0/g(senα-μd*cosα)=4.515 s

S(tmax)=Smax => Smax=V0*tmax-1/2*g(senα+μd*cosα)*tmax^2=45.15 m/s

hmax=Smax*sinα=11.67 m

dinamica es 11



ma=42.6 Kg
mb=13.2 Kg
α=42°
μs=0.56
μd=0.25

a) SISTEMA IN EQUILIBRIO:
si tiene conto di Fs e non di Fd nel calcolo

ma: mb:

X: T-Fs-Fpa*sinα=ma*a | mb*(q-a)-ma*q*cosα*μs-ma*q*sinα=ma*a | Fpb-T=mb*a | T=mb*q-mb*a | T=mb*(q-a)
Y: N-Fpa*cosα=0 | N=ma*q*cosα

mb*q-ma*q*cosα*μs-ma*q*sinα=(ma+mb)*a
a=(mb*q-ma*q*cosα*μs-ma*q*sinα)/(ma+mb)= -5.8 m/s

e quindi se si pone il sistema in equilibrio il corpo
comincerà a scendere verso il basso

b) IL CORPO A SALE LUNGO IL PIANO
si tiene conto di Fd che scende lungo il piano

ma: mb:

X: T-Fd-Fpa*sinα=ma*a | mb*(q-a)-ma*q*cosα*μd-ma*q*sinα=ma*a | Fpb-T=mb*a | T=mb*q-mb*a | T=mb*(q-a)
Y: N-Fpa*cosα=0 | N=ma*q*cosα

mb*q-ma*q*cosα*μd-ma*q*sinα=(ma+mb)*a
a=(mb*q-ma*q*cosα*μd-ma*q*sinα)/(ma+mb)

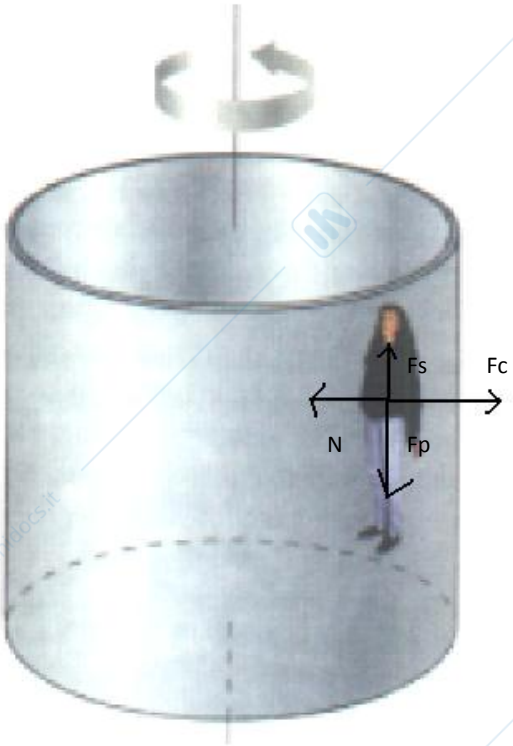
c) IL CORPO A SCENDE LUNGO IL PIANO
si tiene conto di Fd che sale lungo il piano

ma: mb:

X: T+Fd-Fpa*sinα=ma*a | mb*(q-a)+ma*q*cosα*μd-ma*q*sinα=ma*a | -Fpb+T=mb*a | T=-mb*q+mb*a | T=mb*(a-q)
Y: N-Fpa*cosα=0 | N=ma*q*cosα

mb*q+ma*q*cosα*μd-ma*q*sinα=(ma-mb)*a
a=(mb*q+ma*q*cosα*μd-ma*q*sinα)/(ma-mb)

dinamica es 12



Fp=m*g
Fs=N*μs
N-Fc=0 => N=Fc
Fc=m*ω^2*R
ω=2π/T

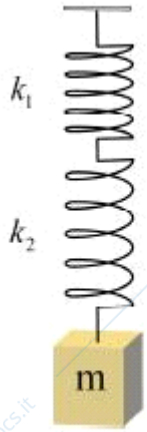
per avere un sistema in equilibrio:

Fp=Fc*μs

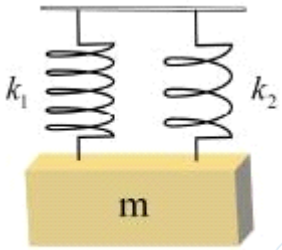
m*g=mω^2*R*μs
T^2=(4π^2*R*μs)/g

dinamica es 13

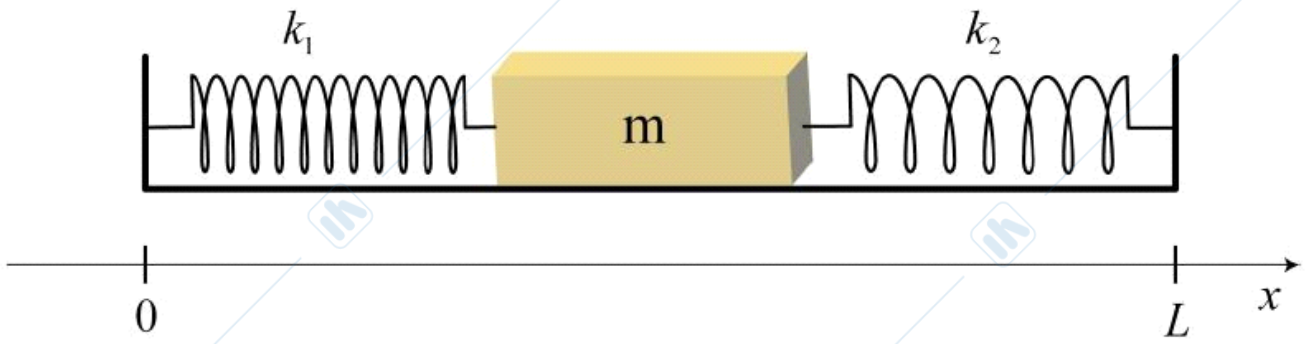
Keq=(k1*k2)/(k1+k2)



keq=k1+k2



dinamica es 14



a) SISTEMA IN EQUILIBRIO
per avere un sistema in equilibrio deve essere soddisfatta l'equazione: $k1*\Delta L1=k2*\Delta L2$