I) USARE S.R. INERZIALI

II) $\vec{F}_r = m\vec{a}$

III) $\vec{F}_{AB} = -\vec{F}_{BA}$

HOOKE $F_x = -kx$

4.1

4.1

A

$\vec{g}$

R

θ

C

O

R

B

Y

X

t NON DIPENDE DALLA POSIZIONE DI B

W

$\vec{N}$

m

θ

u

$m\vec{g}$

$W = 0$

$u(t) = ?$

PROIETTIAMO II PRINCIPIO SU u E W

$$\begin{cases} u) \quad mg\cos\theta = m\ddot{u} = ma_u \\ w) \quad N - mg\sin\theta = 0 \rightarrow N = mg\sin\theta \end{cases}$$

$$a_u = g\cos\theta$$

∀ PROBLEMA

1) DIAGRAMMA DI CORPO LIBERO ∀ CORPO

2) SIST. RIF.

3) NEWTON

4) RELAZ. CINEMATICHE

I) USARE S.R. INERZIALI

II) $\vec{F}_r = m\vec{a}$

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$\forall$ PROBLEMA

1) DIAGRAMMA DI CORPO LIBERO $\forall$ CORPO

2) SIST. RIF.

3) NEWTON

4) RELAZ. CINEMATICHE

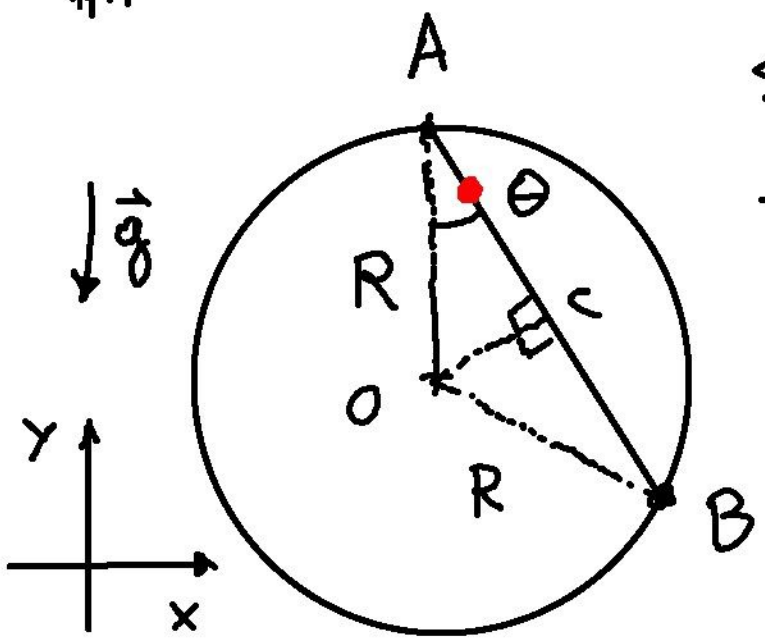
$a_u = g\cos\theta$

$AC = R\cos\theta$

$AC = CB$

$AB = 2AC = 2R\cos\theta$

4.1



$s = \frac{1}{2}at^2$ (PART. DA FERMO)

$t = \sqrt{\frac{2s}{a}} = \sqrt{\frac{2\,\overline{AB}}{a_u}} =$

$= \sqrt{\frac{2 \cdot 2R\cos\theta}{g\cos\theta}} = 2\sqrt{\frac{R}{g}}$

4.9

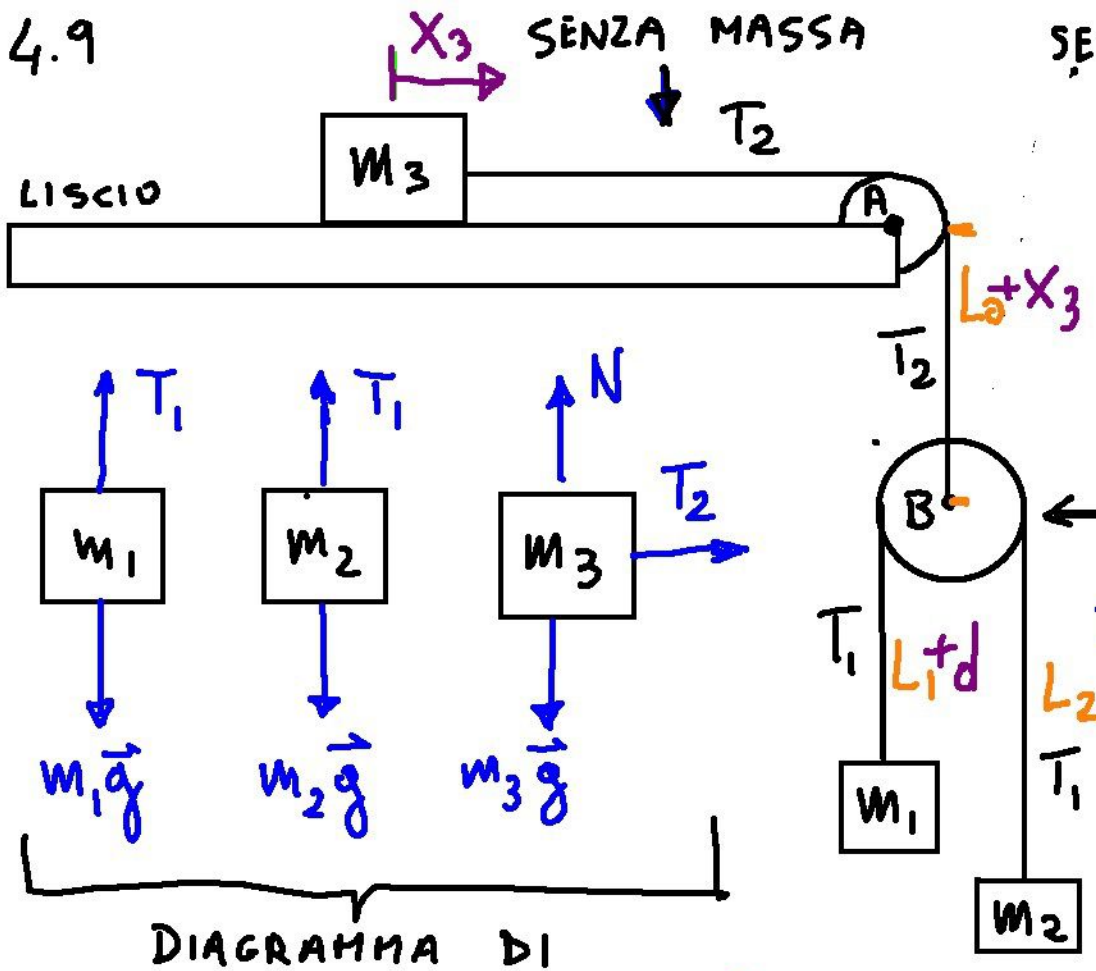
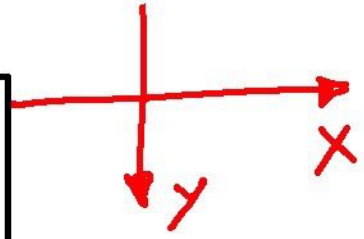


DIAGRAMMA DI CORPO LIBERO



2 CORPI → 1 EQ IN +
3 CORPI → 2 EQ IN +

SENZA MASSA, SENZA ATTRITO (CARRUCOLE)

T_1
T_2
N
a_{1y}
a_{2y}
a_{3x}

$$\begin{cases} (1)\,y) & m_1 g - T_1 = m_1 a_{y1} \quad 1 \\ (2)\,y) & m_2 g - T_1 = m_2 a_{y2} \quad 2 \\ (3)\,y) & m_3 g - N = 0 \quad 3 \\ (3)\,x) & T_2 = m_3 a_{x3} \quad 4 \end{cases}$$

6 INC.

$$2T_1 - T_2 = 0 \quad (m_{CARR}=0) \quad 5$$

$$y_1 = (L_0 + x_3) + (L_1 + d) +$$
$$y_2 = (L_0 + x_3) + (L_2 - d) =$$

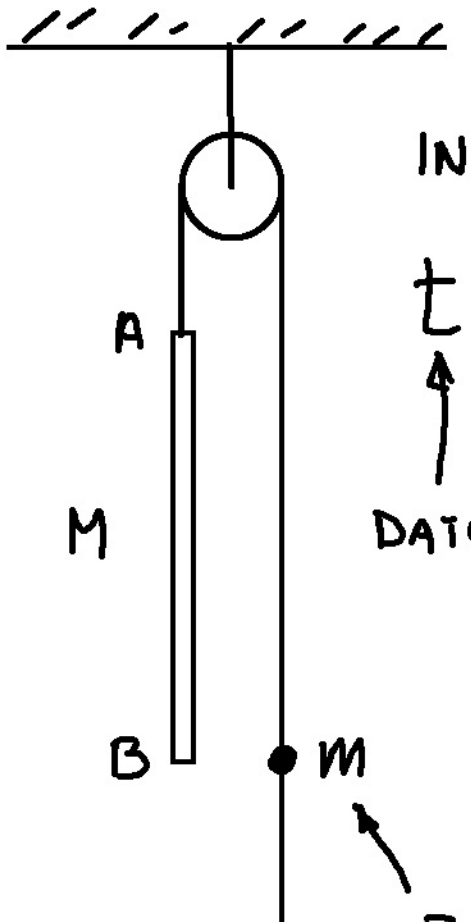
$$y_1 + y_2 = 2L_0 + 2x_3 + L_1 + L_2$$

$\frac{d}{dt}$ → $v_{y1} + v_{y2} = 2v_{x3}$

$\frac{d}{dt}$ → $a_{y1} + a_{y2} = 2a_{x3}$!!! 6

RELAZ. CINEMATICA

4.11



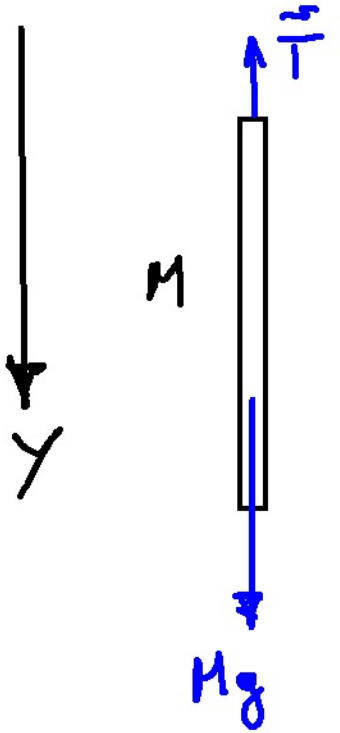
INIZ. FERMI

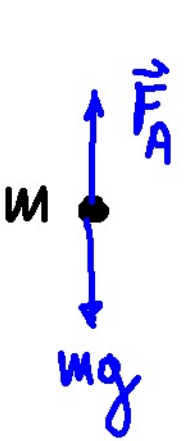
t: m HA LA STESSA Y DI A

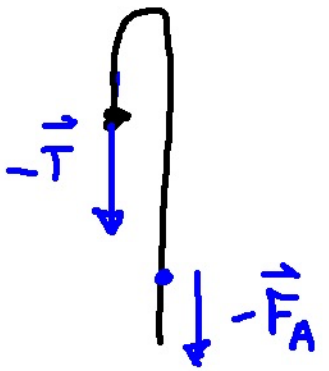
↑ DATO DEL PROB

$\vec{F}_A = ?$

PUÒ SCORRERE SULLA CORDA CON ATTRITO







$|\vec{T}| = |\vec{F}_A|$ ← (4)

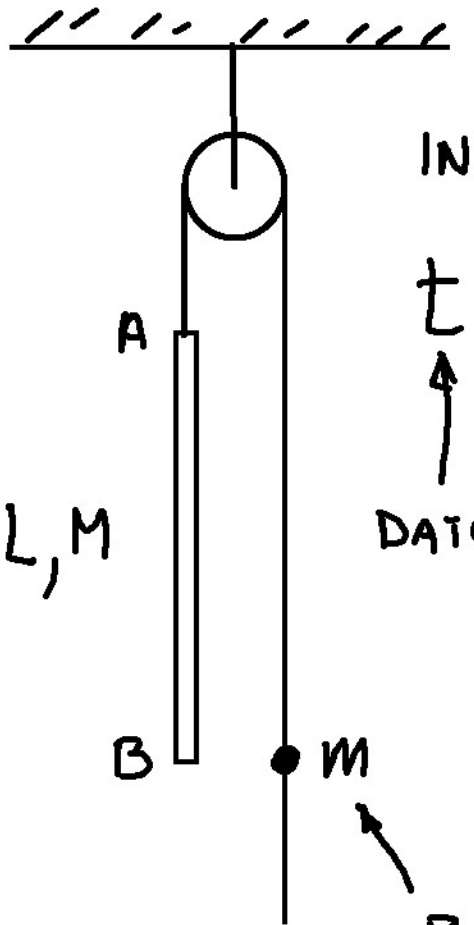
$$\begin{cases} Mg - T = MA_y \\ mg - T = ma_y \end{cases}$$

$$\begin{cases} mMg = mT + MmA_y \\ mMg = MT + mMa_y \end{cases} =$$

$$0 = (m-M)T + Mm(A_y - a_y)$$

$$A_y - a_y = \frac{T}{Mm}(M-m)$$

4.11



INIZ. FERMI

t: M HA LA STESSA Y DI A

DATO DEL PROB

$\vec{F}_A = ?$

PUÒ SCORRERE SULLA CORDA CON ATTRITO

Y

SPOST. RELATIVO L

ACC. RELATIVA $A_y - a_y$

$\left(s = \frac{1}{2} a t^2\right)$

$L = \frac{1}{2}(A_y - a_y) t^2$

$(A_y - a_y) = \frac{2L}{t^2}$ (2)

$T = F_A$ (4)

(1)+(2) $\rightarrow \frac{2L}{t^2} = \frac{T}{Mm}(M-m) \rightarrow F_A = \frac{2LMm}{t^2(M-m)}$

$$\begin{cases} mMg = mT + MmA_y \\ mMg = MT + mMa_y \end{cases} =$$

$$0 = (m-M)T + Mm(A_y - a_y)$$

$$A_y - a_y = \frac{T}{Mm}(M-m) \quad (1)$$