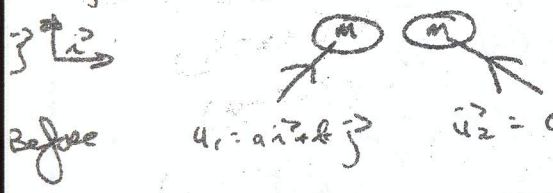
1972

G3. Laws [NOTES]

Smoothness ⇒ $\vec{j}$ cpts of speed remain unchanged.

After $\vec{v_1} = c\vec{i} + b\vec{j}$ · $\vec{v_2} = x\vec{i} + 0\vec{j}$




$e = 1$

P.C.M. ($\vec{i}$ dir$^n$) ⇒ $ma + m0 = mc + mx$

$\boxed{a = c + x}$ —①

NLR: ($\vec{i}$ dir$^n$) ⇒ $x - c = -1(0 - a)$

$\boxed{x - c = a}$ ②

① + ② ⇒ $x - c = c + x$

⇒ $-2c = 0$

⇒ $\boxed{c = 0}$,

② ⇒ $\boxed{x = a}$

So $\vec{v_1}$ is $0\vec{i} + b\vec{j}$ and $\vec{v_2} = a\vec{i} + 0\vec{j}$.

$\vec{v}$ is obviously $\perp$ to $\vec{v_2}$.

// OR $\vec{v_1} \cdot \vec{v_2} = (0\vec{i} + b\vec{j}) \cdot (a\vec{i} + 0\vec{j})$

$= 0 \cdot a + b \cdot 0$

$= 0$ //

ΔKE: KE before $= \frac{1}{2} m(a^2 + b^2) + \frac{1}{2} m 0^2$

KE After $= \frac{1}{2} m(0^2 + 0^2) + \frac{1}{2}(m)(a^2 + 0^2)$

$= \frac{1}{2} m(a^2 + b^2)$

⇒ ΔKE $= 0$ qed.