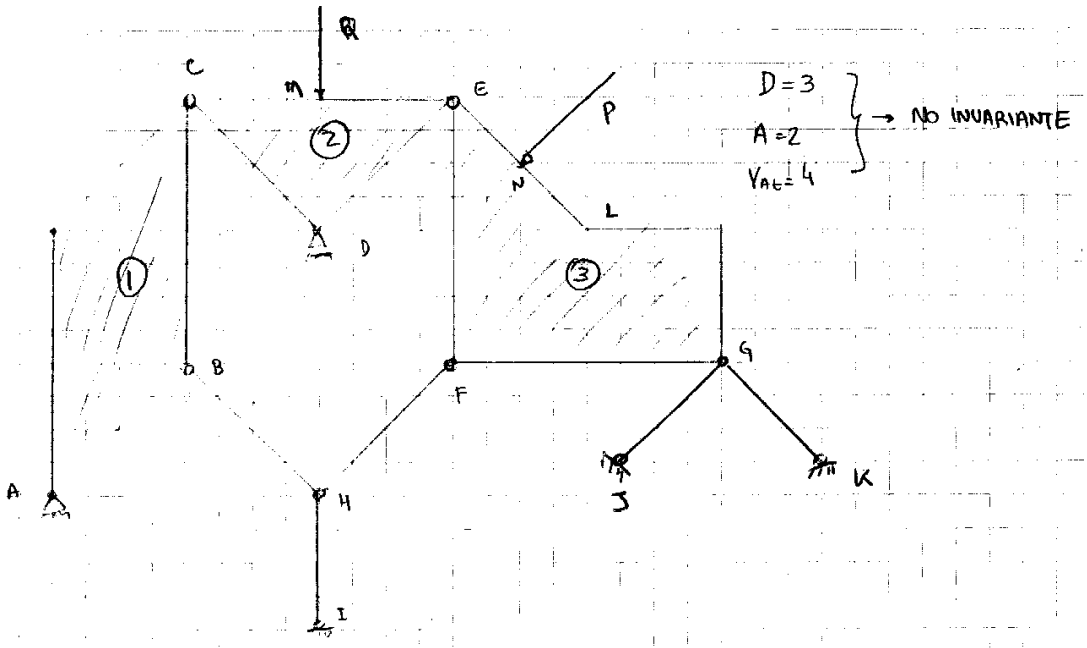
Solución – Primer parcial 2004 – Resistencia de materiales 1N

Ejercicio 2

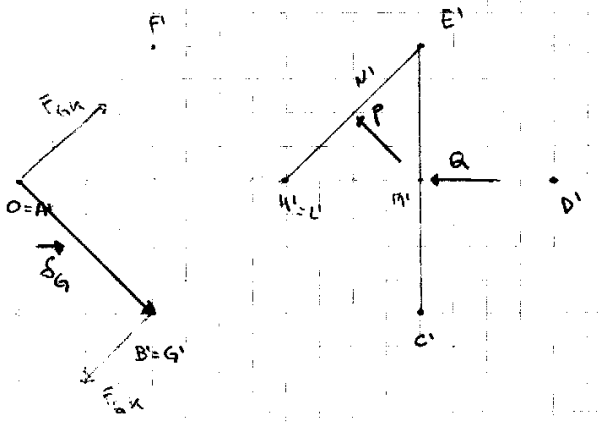


$D = 3$
$A = 2$
$V_{AL} = 4$
→ NO INVARIANTE

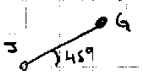
2) Imponemos desplazamiento virtual de H

Orden de hallar los puntos:

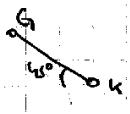
A, H, B, C, D, E, F, G



a) Para que sea no invariante la fuerza que hace la biela (luego de girarla 90°) aplicada en G' no debe generar momento con respecto a O ⇒ La biela GJ hace al sistema no invariante



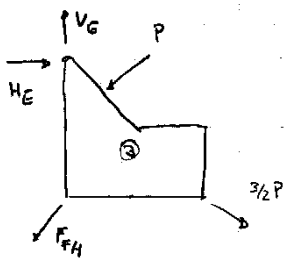
b) La biela que genera mayor momento →



3) $M = \vec{\delta_G} \cdot \vec{F_{GK}} + \vec{Q} \cdot \vec{\delta_M} + \vec{P} \cdot \vec{\delta_N} = F_{GJ} \cdot \frac{\delta}{\sqrt{2}} - P\left(\frac{\delta}{4\sqrt{2}} + \frac{5\delta}{4\sqrt{2}}\right) = 0$

$$F_{GJ} = \frac{3}{2}P$$ (biela traccionada)

Disco 3



$$M_E = P\frac{\sqrt{2}}{2} + F_{FH}\cdot\sqrt{2} = 0 \rightarrow F_{FH} = -\frac{P}{2}$$

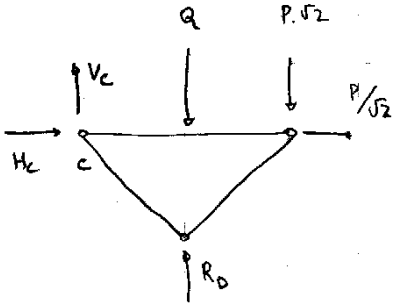
Ep. Vertical: $V_E - \frac{P}{\sqrt{2}} - \frac{3}{2\sqrt{2}}P + \frac{P}{2\sqrt{2}} = 0$

$\rightarrow V_G = \sqrt{2}P$

Ep. Horizontal: $H_E + \frac{P}{2\sqrt{2}} - \frac{P}{\sqrt{2}} + \frac{3}{2\sqrt{2}}P = 0$

$$H_E = -\frac{P}{\sqrt{2}}$$

Disco 2



$M_C = 0 = Q - R_D + 2\sqrt{2}P = 0 \rightarrow R_D = Q + 2\sqrt{2}P$

Ep. Vertical: $V_C + R_D - Q - P\sqrt{2} = 0$

$V_C = \cancel{Q} + P\sqrt{2} - \cancel{Q} - 2\sqrt{2}P = -\sqrt{2}P$

$$V_C = -\sqrt{2}P$$

Ep. Horizontal: $H_C = -\frac{P}{\sqrt{2}}$