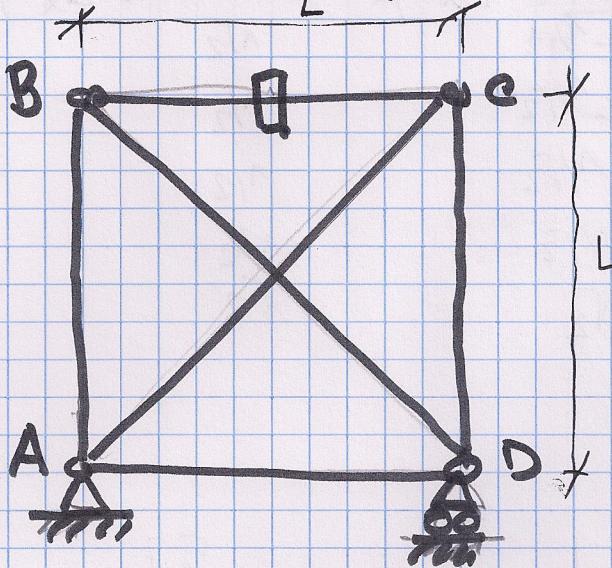


PROBLEMA 18 Error montaje

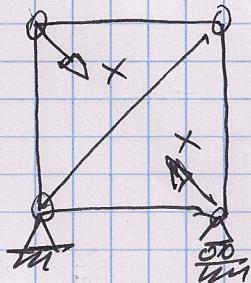


Al montar la estructura se desplaza la barra BC con un error de $0'001L$ (más corta).
(alcantar tensiones)

El problema es casi idéntico al "3". Diferencias

- En este estructura NO se puede prescindir de la barra AD porque, en este caso, si la tira una tensión.
- El Grado es 1° 6 (barras) + 3 (reacciones) - 2×4 nudos

(En este caso no hay reacciones en los apoyos, pero también sirven para hacer las ecuaciones de la estática; la ecuación sigue siendo aplicable)



S. hipotético equivalente

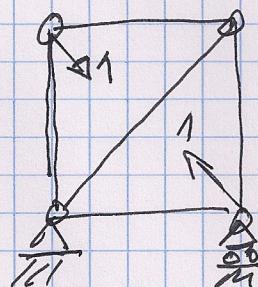
$$N_{AB} = N_{AD} = N_{BC} = N_{BD} = -\frac{X}{\sqrt{2}}$$

$$N_{CA} = X$$

S. virtual

$$N_{AB} = N_{AD} = N_{BC} = N_{BD} = -\frac{1}{\sqrt{2}}$$

$$N_{CA} = 1$$



| Barrera | long. | $\frac{N}{R}$ | N^4 | $\Delta L^R \left(\frac{\Delta E}{Lx} \right)$ | $\Delta L^R \times N^4 \left(\frac{\Delta E}{Lx} \right)$ |
|---------|-------------|---------------|---------------|---|--|
| AB | L | $-x/\sqrt{2}$ | $-1/\sqrt{2}$ | $-1/\sqrt{2}$ | $1/2$ |
| BC | L | $-x/\sqrt{2}$ | $-1/\sqrt{2}$ | $-1/\sqrt{2}$ | $1/2$ |
| CD | L | $-x/\sqrt{2}$ | $-1/\sqrt{2}$ | $-1/\sqrt{2}$ | $1/2$ |
| AD | L | $-x/\sqrt{2}$ | $-1/\sqrt{2}$ | $-1/\sqrt{2}$ | $1/2$ |
| AC | $\sqrt{2}L$ | X | 1 | $\sqrt{2}$ | $\sqrt{2}$ |

Aplicando PTV

$$1 \cdot \Delta_{BD} = 1 \times \left[-\frac{L\sqrt{2}X}{AE} - 0'001L \right] \quad [1]$$

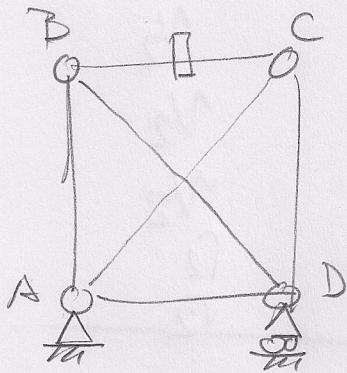
$$\sum_{\text{barras}} \Delta L_i^R \cdot N_i^4 = \left[\frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \sqrt{2} \right] \times \frac{LX}{AE} \quad [2]$$

NOTA: Para discusion sobre los signos en [1] ver problema "5"

Resolviendo $[1] = [2]$

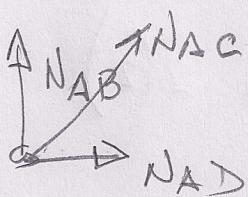
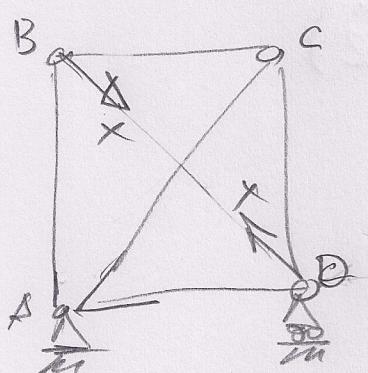
$$\boxed{X = \frac{-A \cdot E}{(2+2\sqrt{2})}}$$

CALCULO



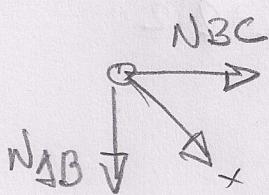
$$L_{BC} = L - 0.1\% L = 0.999 L$$

$$GdH = 6 + 3 - 2 \times 4 = 1$$



$$\sqrt{2} N_{AC} = -N_{AB} = -N_{AD}$$

$$N_{BC} = N_{AB} = -x/\sqrt{2}$$

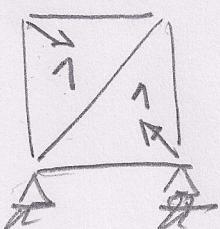


$$\sqrt{2} N_{CA} = -N_{BC} = -N_{CD}$$

$$N_{AB} = N_{AD} = N_{BC} = N_{CD} = -x/\sqrt{2}$$

$$N_{CA} = x$$

VIRTOAL



$$N_{AB} = N_{AD} = N_{BC} = N_{CD} = -\frac{1}{\sqrt{2}}$$

$$N_{CA} = 1$$