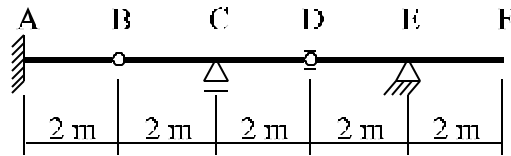


## Vigas Gerber

### 2ª QUESTÃO - PROVA DE RECUPERAÇÃO DE 1995

Traçar as linhas de influência das reações do apoio A. Determinar os valores máximo e mínimo destas reações para o carregamento indicado.

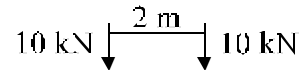


Carregamento móvel:

- Distribuído:

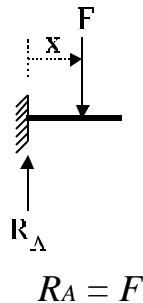


- Trem-tipo:

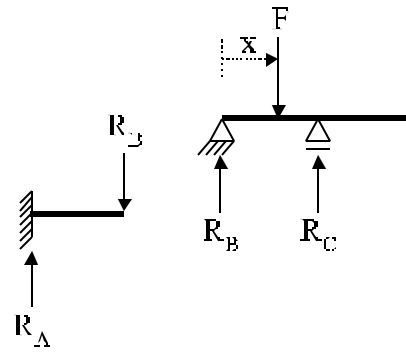


Resolução:

- Força  $F$  unitária no trecho AB:

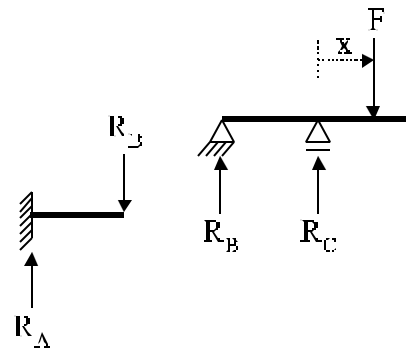


- Força  $F$  unitária no trecho BC:



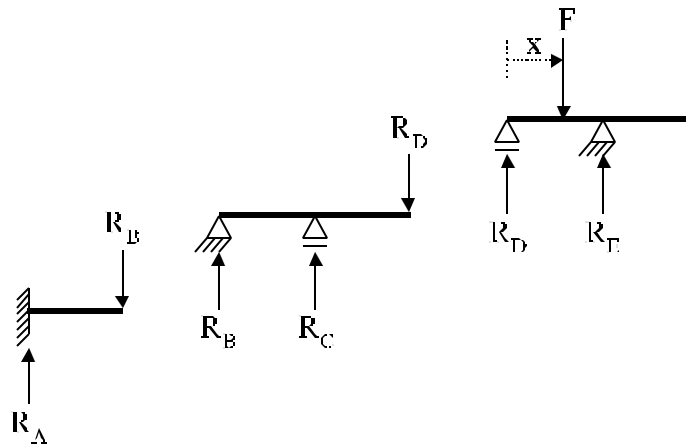
$$R_A = R_B = F \cdot (2-x) / 2$$

- Força F unitária no trecho CD:



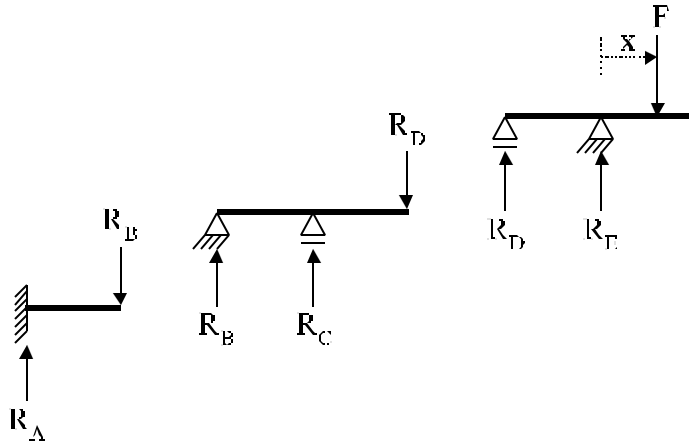
$$R_A = R_B = -F \cdot x / 2$$

- Força F unitária no trecho DE:

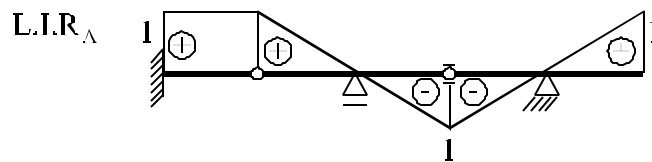


$$R_A = R_B = -R_D = -F \cdot (2-x) / 2$$

- Força F unitária no trecho EF:



$$R_A = R_B = -R_D = F \cdot x / 2$$

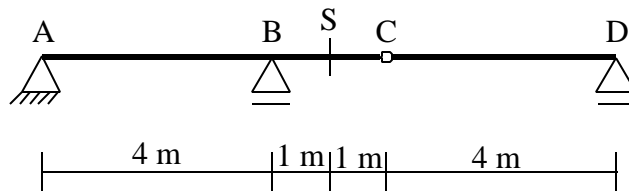


$$R_{Amax} = (10 \cdot 1 \cdot 2) + (10 \cdot 1 \cdot 2 / 2) + (10 \cdot 1 \cdot 2 / 2) + 10 \cdot 1 + 10 \cdot 1 = 60 \text{ kN}$$

$$R_{Amin} = - (10 \cdot 1 \cdot 4 / 2) - 10 \cdot 0,5 - 10 \cdot 0,5 = - 30 \text{ kN}$$

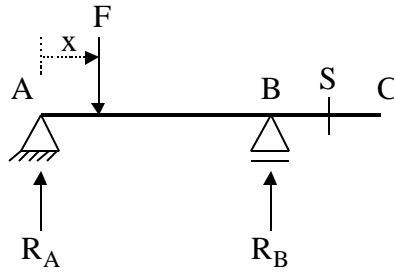
### 3ª QUESTÃO - PROVA SUBSTITUTIVA DE 1994 - ( 3,0 )

Determinar as linhas de influência de momento fletor e força cortante para a seção S da estrutura abaixo.



Solução:

- Força F unitária no trecho AB:



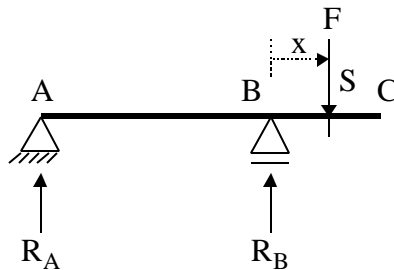
$$R_A = F \cdot (4 - x) / 4$$

$$R_B = F \cdot x / 4$$

$$V_S = R_A - F + R_B = 0$$

$$M_S = R_A \cdot 5 - F \cdot (5 - x) + R_B \cdot 1 = 0$$

- Força F unitária no trecho BC:



$$R_A = - F \cdot x / 4$$

$$R_B = F \cdot (4 + x) / 4$$

- para  $x < 1$ :

$$V_S = R_A + R_B - F = 0$$

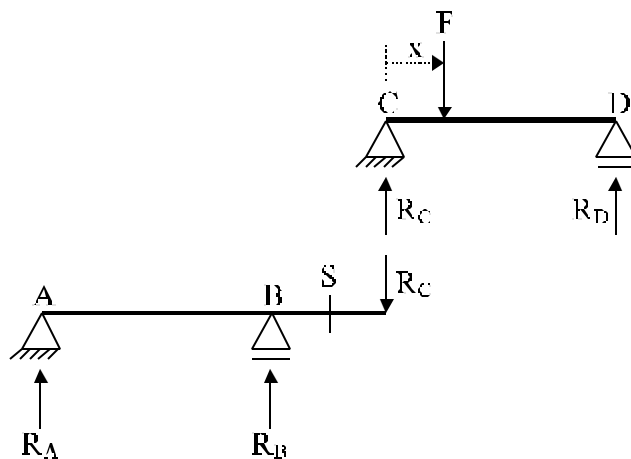
$$M_S = R_A \cdot 5 + R_B \cdot 1 - F \cdot (1 - x) = 0$$

- para  $x > 1$ :

$$V_S = R_A + R_B = F$$

$$M_S = R_A \cdot 5 + R_B \cdot 1 = F - F \cdot x$$

- Força F unitária F no trecho CD:



$$R_C = F \cdot (4 - x) / 4$$

$$V_S = R_C = F \cdot (4 - x) / 4$$

$$M_S = -R_C \cdot l = -F \cdot (4 - x) / 4$$

*Diagramas de linhas de influência:*

