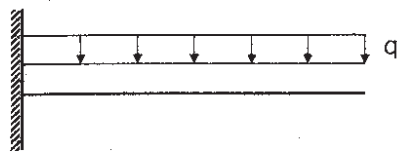
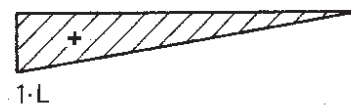
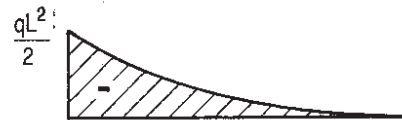
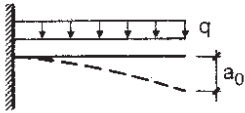
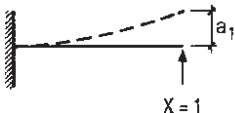


Système fondamental :



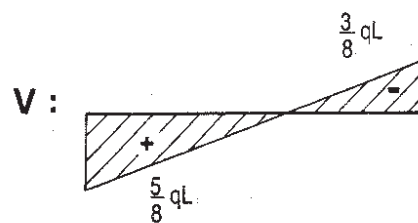
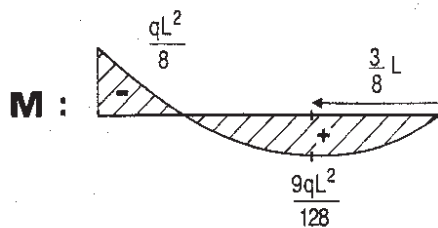
Moments :



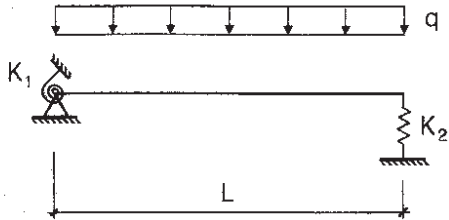
| | | |
|----------------------|---|--|
| causes |  |  |
| effets | | |
| déplacements selon X | $a_0 = -\frac{qL^4}{8EI}$ | $a_1 = \frac{L^3}{3EI}$ |

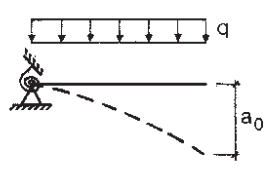
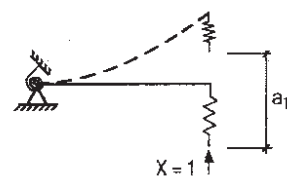
Condition de compatibilité cinématique :

$$a_0 + a_1 = 0 \quad \rightarrow \quad X = -\frac{a_0}{a_1} = \frac{3}{8} qL$$



2.



| | | |
|----------------------|---|--|
| causes |  |  |
| effets | | |
| déplacements selon X | $a_0 = -\frac{qL^4}{8EI} - \frac{qL^3}{2K_1}$ | $a_1 = \frac{L^3}{3EI} + \frac{1}{K_2} + \frac{L^2}{K_1}$ |

Condition de compatibilité cinématique :

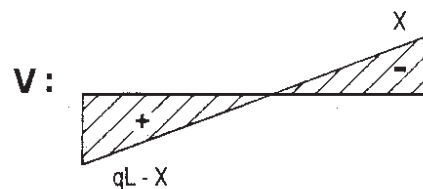
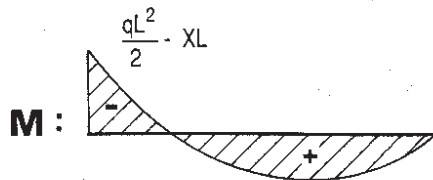
$$a_0 + a_1 = 0 \implies X = -\frac{a_0}{a_1} = \frac{\frac{qL^4}{8EI} + \frac{qL^3}{2K_1}}{\frac{L^3}{3EI} + \frac{1}{K_2} + \frac{L^2}{K_1}}$$

Discussion :

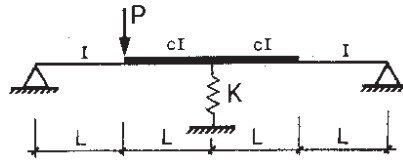
$$K_1 = K_2 = \infty \implies \text{N}^\circ 1$$

$$K_1 = \infty \quad K_2 = 0 \quad X = 0$$

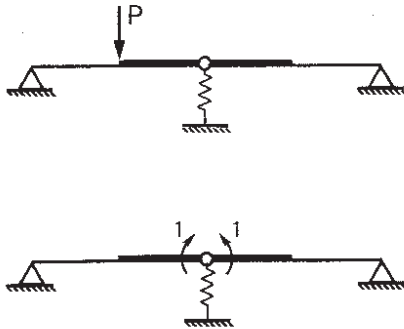
$$K_1 = 0 \quad K_2 = \infty \quad X = \frac{qL}{2}$$



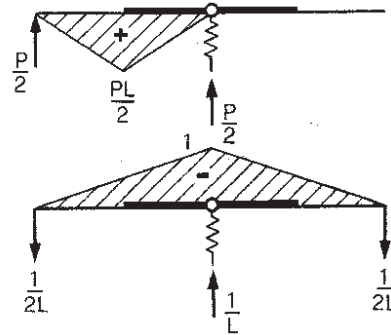
3.



Système fondamental :



Moments :



| | | |
|----------------------|--|--|
| causes | | |
| effets | | |
| déplacements selon X | $a_0 = -\frac{PL^2}{12EI} - \frac{PL^2}{6cEI} + \frac{P}{2KL}$ | $a_1 = \frac{L}{6EI} + \frac{7L}{6cEI} + \frac{1}{KL^2}$ |

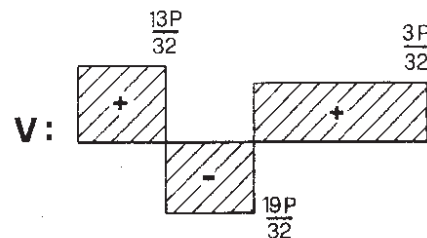
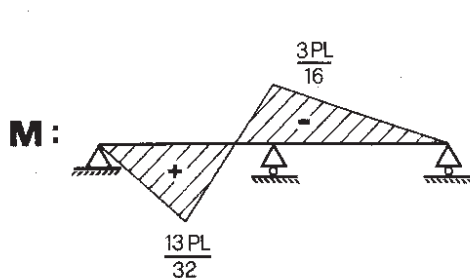
Condition de compatibilité cinématique :

$$a_0 + a_1 = 0 \quad \rightarrow \quad X = -\frac{a_0}{a_1}$$

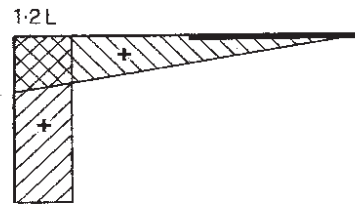
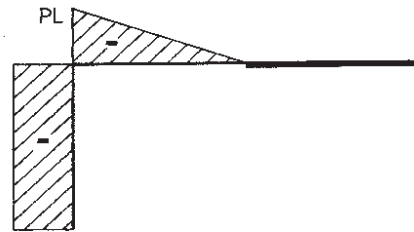
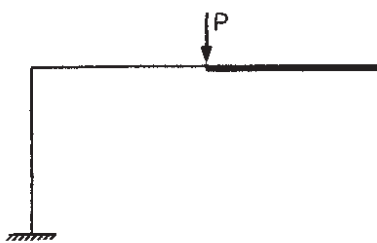
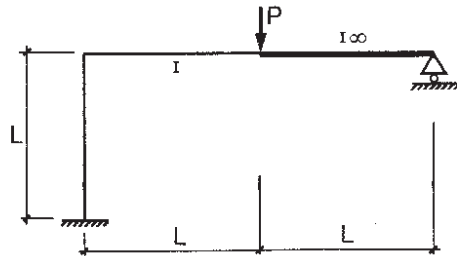
Discussion :

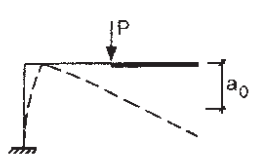
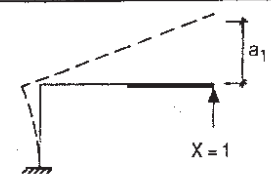
$$K = 0 \quad C = 1 \quad X = -\frac{PL}{2}$$

$$K = \infty \quad C = 1 \quad X = \frac{3PL}{16}$$



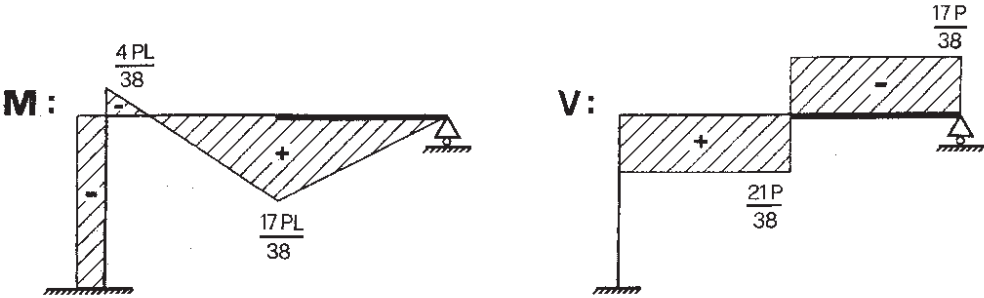
4.



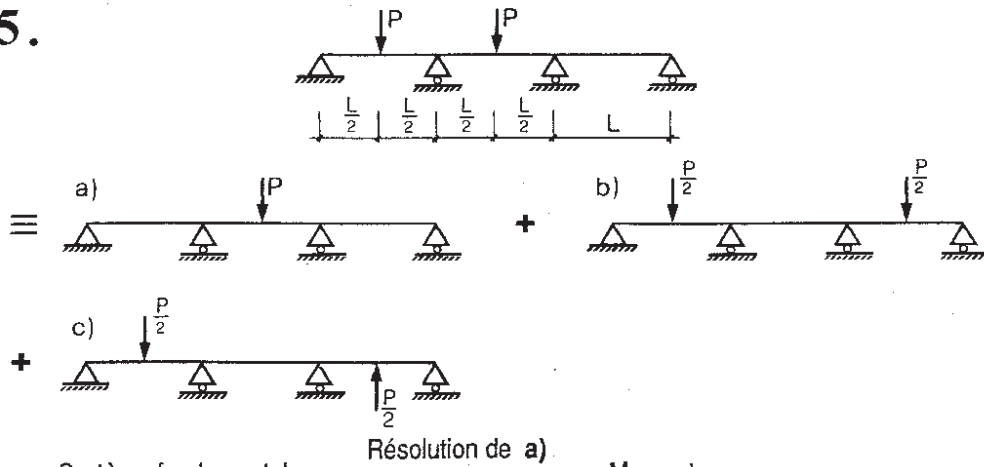
| | | |
|-------------------------|---|--|
| causes |  |  |
| effets | | |
| déplacements selon X | $a_0 = -\frac{17PL^3}{6EI}$ | $a_1 = \frac{19L^3}{3EI}$ |

Condition de compatibilité cinématique :

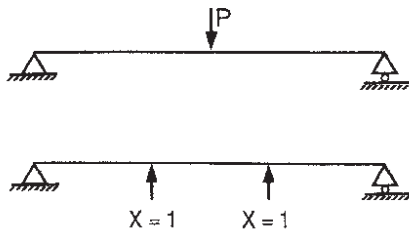
$$a_0 + a_1 X = 0 \implies X = -\frac{a_0}{a_1} = \frac{17 P}{38}$$



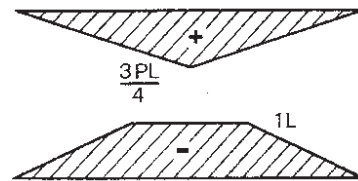
5.



Système fondamental :



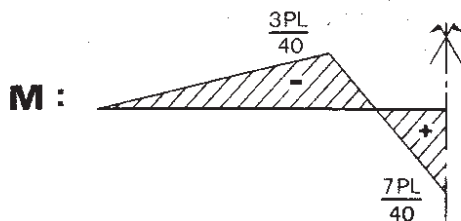
Moments :



| | | |
|----------------------|------------------------------|--------------------------|
| causes | | |
| effets | | |
| déplacements selon X | $a_0 = -\frac{23PL^3}{24EI}$ | $a_1 = \frac{5L^3}{3EI}$ |

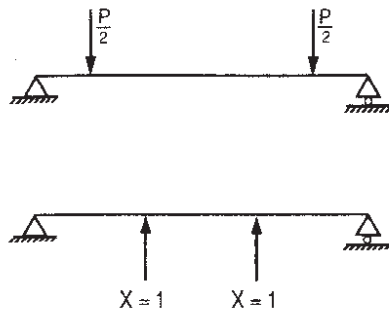
Condition de compatibilité cinématique :

$$a_0 + a_1 X = 0 \quad \rightarrow \quad X = -\frac{a_0}{a_1} = \frac{23P}{40}$$

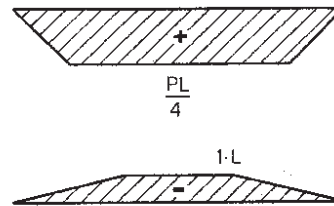


Résolution de b)

Système fondamental :



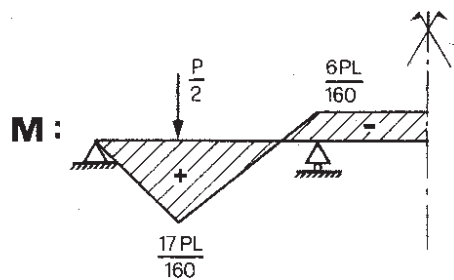
Moments :



| | | |
|----------------------|------------------------------|--------------------------|
| causes | | |
| effets | | |
| déplacements selon X | $a_0 = -\frac{23PL^3}{48EI}$ | $a_1 = \frac{5L^3}{3EI}$ |

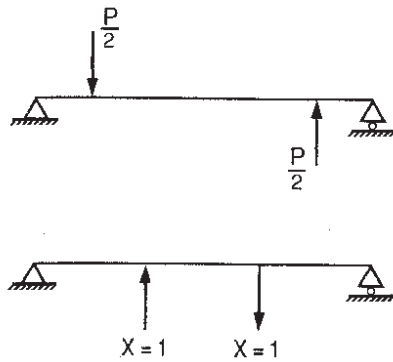
Condition de compatibilité cinématique :

$$a_0 + a_1 X = 0 \quad \rightarrow \quad X = -\frac{a_0}{a_1} = \frac{23P}{80}$$

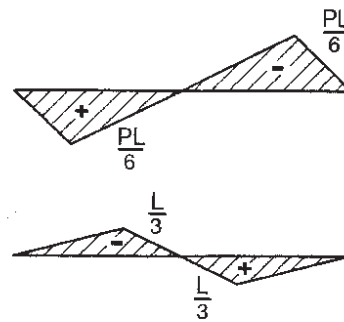


Résolution de c)

Système fondamental :



Moments :

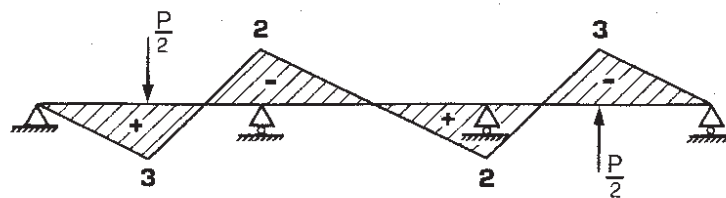


| | | |
|-------------------------|----------------------------|-------------------------|
| causes | | |
| effets | | |
| déplacements selon X | $a_0 = -\frac{7PL^3}{144}$ | $a_1 = \frac{L^3}{9EI}$ |

Condition de compatibilité cinématique :

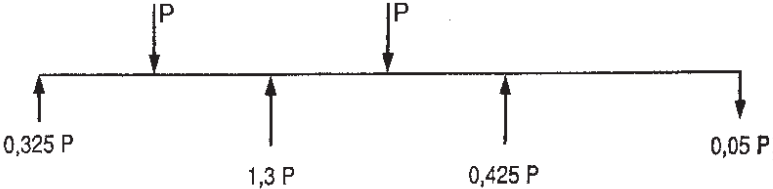
$$a_0 + a_1 X = 0 \quad \rightarrow \quad X = -\frac{a_0}{a_1} = \frac{7P}{16}$$

M: $\left[\frac{PL}{32} \right]$

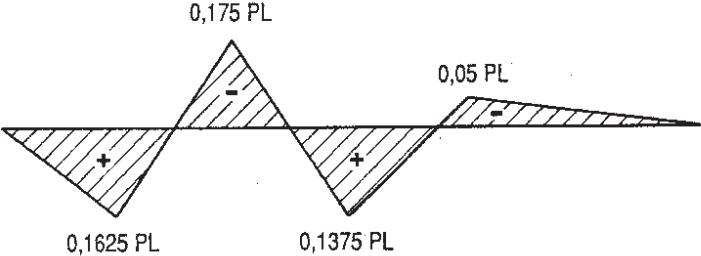


Les différentes grandeurs et diagrammes s'obtiennent par addition

Finalement :



M :



V :

