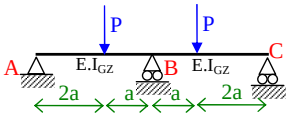
Exemple de résolution de structure hyperstatique utilisation d'un formulaire :

Sujet :

Considérons la structure suivante :

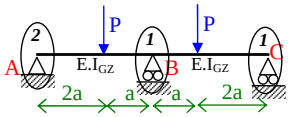


Nous allons rechercher les inconnues de liaisons.

Résolution :

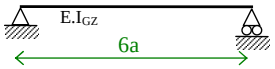
I) Nature :

$$\left.\begin{array}{l} x = 2+1+1 = 4 \\ e = 3\times 1 = 3 \end{array}\right\} \textit{hyperstatique de degré } 1$$

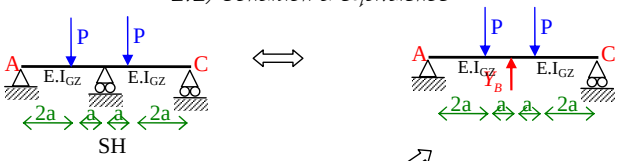


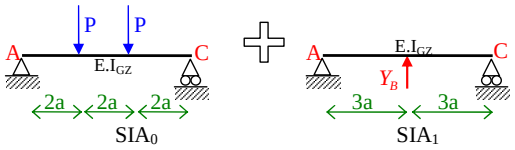
II) Résolution de l'inconnue hyperstatique :

2.1) Choix de la structure isostatique associée :



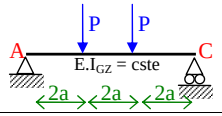
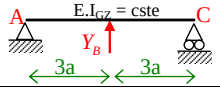
2.2) Condition d'équivalence :



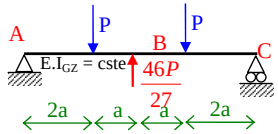
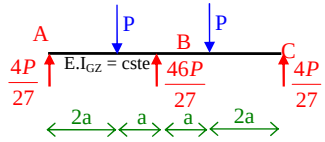


Si $f(x=3a) = 0 = f_{SIA0}(x=3a) + f_{SIA1}(x=3a) = f_0(3a) + f_1(3a)$

2.3) Résolution :

SIA_0		$f_{SIA0}(x=3a) = f_{B0} = -\dfrac{23\times P\times(6a)^3}{648\times E\times I_{GZ}}$
SIA_1		$f_{SIA1}(x=3a) = f_{B1} = \dfrac{Y_B\times(6a)^3}{48\times E\times I_{GZ}}$

$$f_{B0} + f_{B1} = 0 = -\frac{23\times P\times(6a)^3}{648\times E\times I_{GZ}} + \frac{Y_B\times(6a)^3}{48\times E\times I_{GZ}} \Rightarrow Y_B = \frac{46P}{27}$$



III) Résolution des autres inconnues :