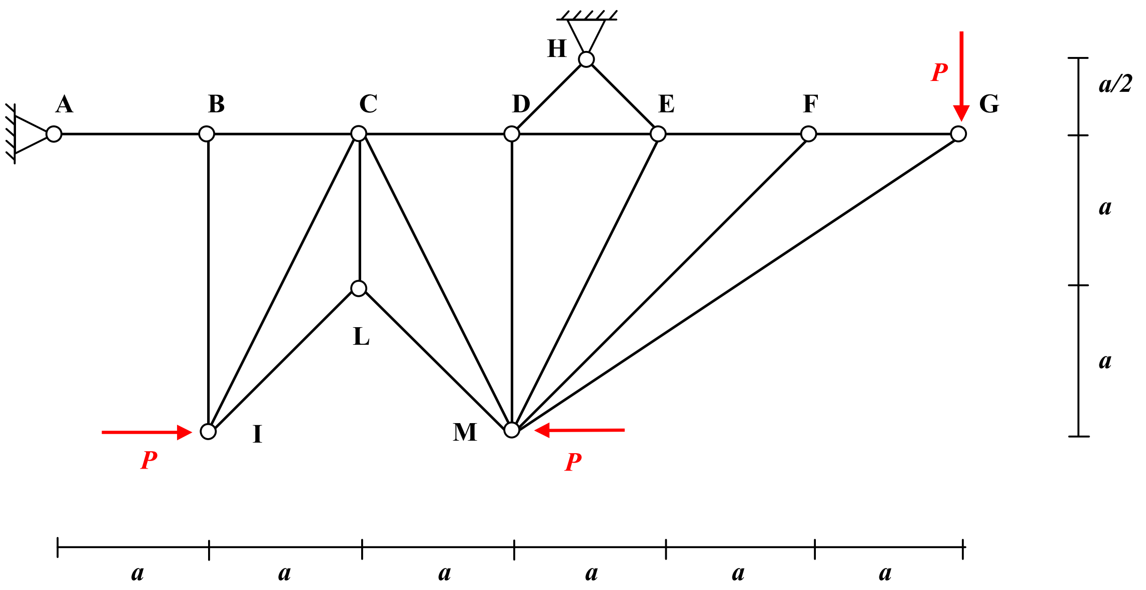
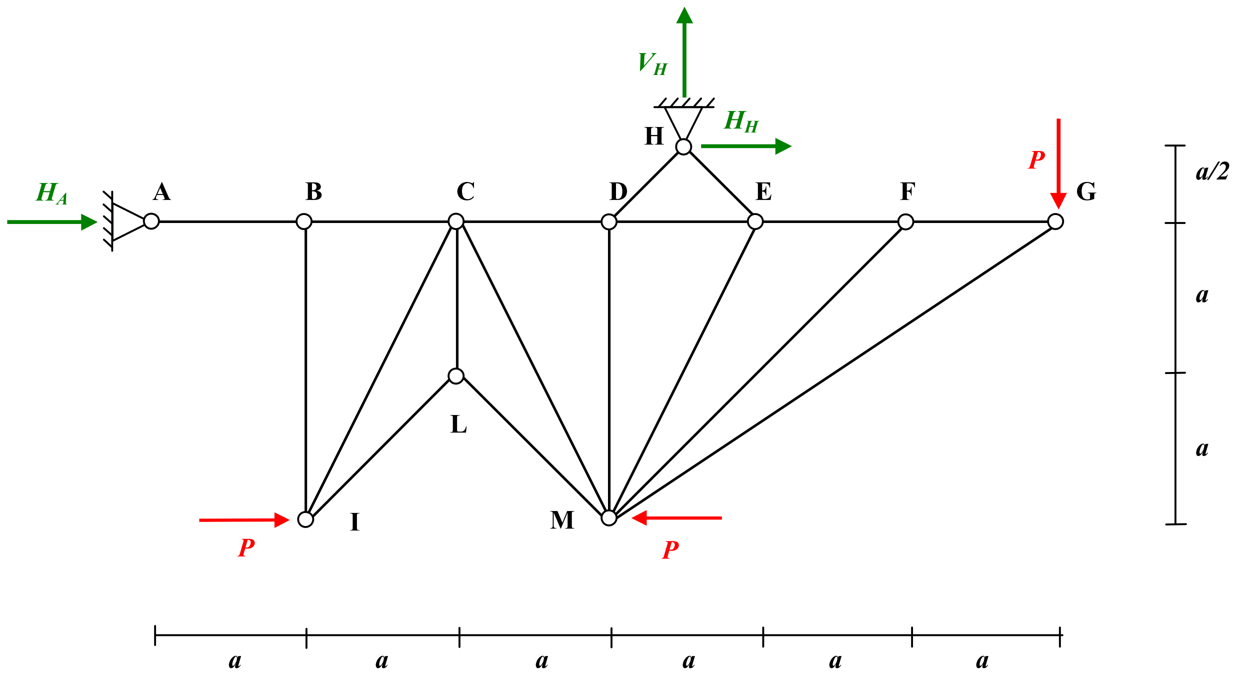
Risolvere la seguente struttura reticolare

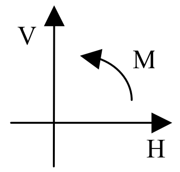


Calcolo delle reazioni vincolari :

Poiché la struttura esternamente è isostatica risolveremo con le equazioni cardinali della statica .

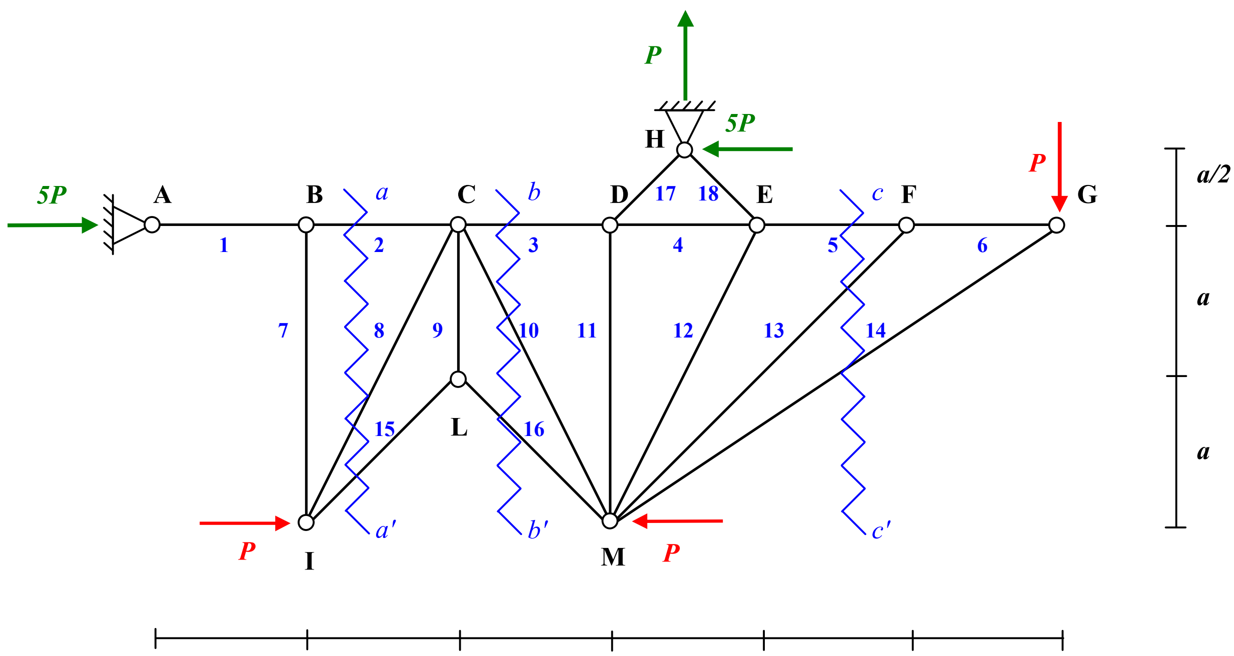


Dalle equazioni cardinali si ha :

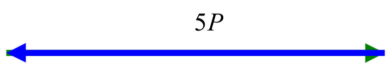


$$\begin{cases} \sum_H : \quad H_A + H_H = 0 \\ \sum_V : \quad V_H - P = 0 \\ \sum_M (H): \quad H_A \cdot \frac{1}{2} a - P \cdot \frac{5}{2} a = 0 \end{cases} \Rightarrow \begin{cases} H_H = -5P \\ V_H = P \\ H_A = 5P \end{cases}$$

Si ha quindi per il sistema equilibrato :



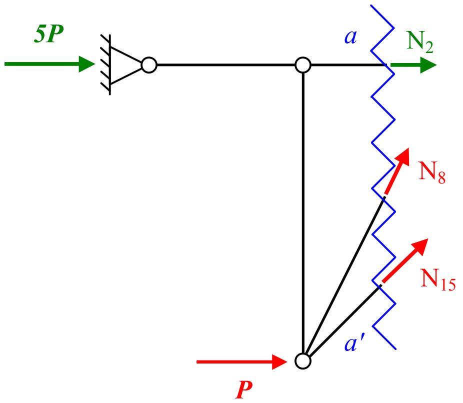
Calcoliamo le aste 2 e 7 col metodo grafico dell'equilibrio al nodo B :



$$N_2 = -5P$$

$$N_7 = 0$$

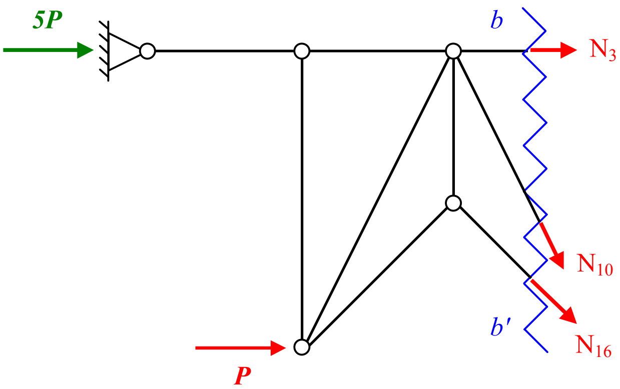
Calcoliamo le aste 8 , 15 col metodo delle sezioni (Ritter) :



$$\sum_M (C):\quad P\cdot 2a+\frac{N_{15}}{\sqrt{2}}\cdot a=0 \quad\Rightarrow\quad N_{15}=-2\sqrt{2}P$$

$$\sum_M (D):\quad P\cdot 2a-\frac{N_{8}}{\sqrt{5}}\cdot 2a=0 \quad\Rightarrow\quad N_{8}=\sqrt{5}P$$

Calcoliamo le aste 3 , 10 e 16 col metodo delle sezioni (Ritter) :

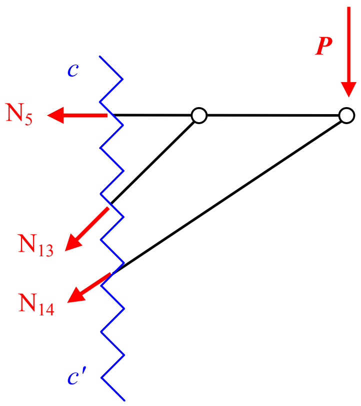


$$\sum_M (L):\quad -5P\cdot 2a-N_3\cdot 2a=0 \quad\Rightarrow\quad N_3=-5P$$

$$\sum_M (B):\quad P\cdot 2a-\frac{2N_{10}}{\sqrt{5}}\cdot a=0 \quad\Rightarrow\quad N_{10}=\sqrt{5}P$$

$$\sum_M (C):\quad P\cdot 2a+\frac{N_{16}}{\sqrt{2}}\cdot a=0 \quad\Rightarrow\quad N_{16}=-2\sqrt{2}P$$

Calcoliamo le aste 5 , 13 e 14 col metodo delle sezioni (Ritter) :

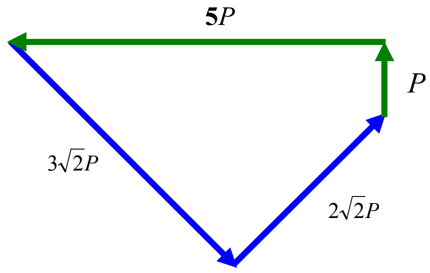


$$\sum_M (M):\quad N_5\cdot 2a-P\cdot 3a=0 \quad\Rightarrow\quad N_5=\frac{3}{2}P$$

$$\sum_M (G):\quad \frac{N_{13}}{\sqrt{2}}\cdot a=0 \quad\Rightarrow\quad N_{13}=0$$

$$\sum_M (F):\quad -P\cdot a-\frac{2N_{14}}{\sqrt{13}}\cdot a=0 \quad\Rightarrow\quad N_{14}=-\frac{\sqrt{13}}{2}P$$

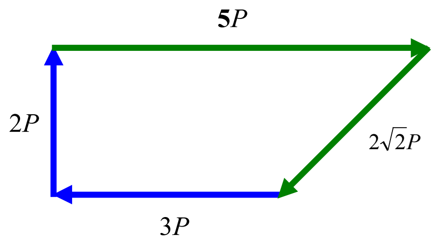
Calcoliamo le aste 17 e 18 col metodo grafico dell'equilibrio al nodo H :



$$N_{17} = -2\sqrt{2}P$$

$$N_{18} = 3\sqrt{2}P$$

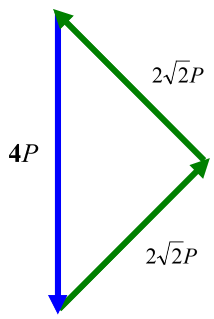
Calcoliamo le aste 4 e 11 col metodo grafico dell'equilibrio al nodo D :



$$N_4 = -3P$$

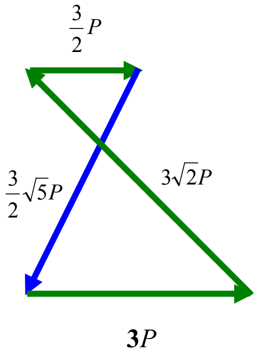
$$N_{11} = 2P$$

Calcoliamo l' asta 9 col metodo grafico dell'equilibrio al nodo L :



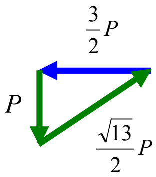
$$N_9 = -4P$$

Calcoliamo l' asta 12 col metodo grafico dell'equilibrio al nodo E :



$$N_{12} = \frac{3}{2}\sqrt{5}P$$

Calcoliamo infine l' asta 6 col metodo grafico dell'equilibrio al nodo G :



$$N_6 = \frac{3}{2}P$$

Riassumendo i valori ottenuti per le singole aste :

ASTE	TIRANTE	PUNTONE
1		$5P$
2		$5P$
3		$5P$
4		$3P$
5	$\frac{3}{2}P$	
6	$\frac{3}{2}P$	
7	/	/
8	$\sqrt{5}P$	
9	/	$4P$
10	$\sqrt{5}P$	
11	$2P$	
12	$\frac{3}{2}\sqrt{5}P$	
13	/	/
14		$\frac{\sqrt{13}}{2}P$
15		$2\sqrt{2}P$
16		$2\sqrt{2}P$
17		$2\sqrt{2}P$
18	$3\sqrt{2}P$	