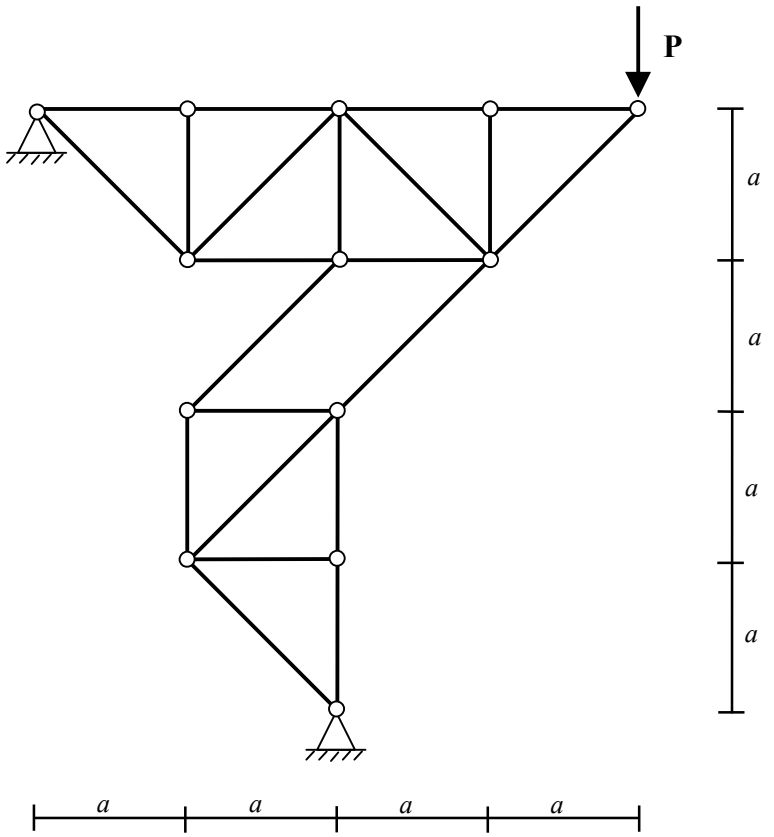
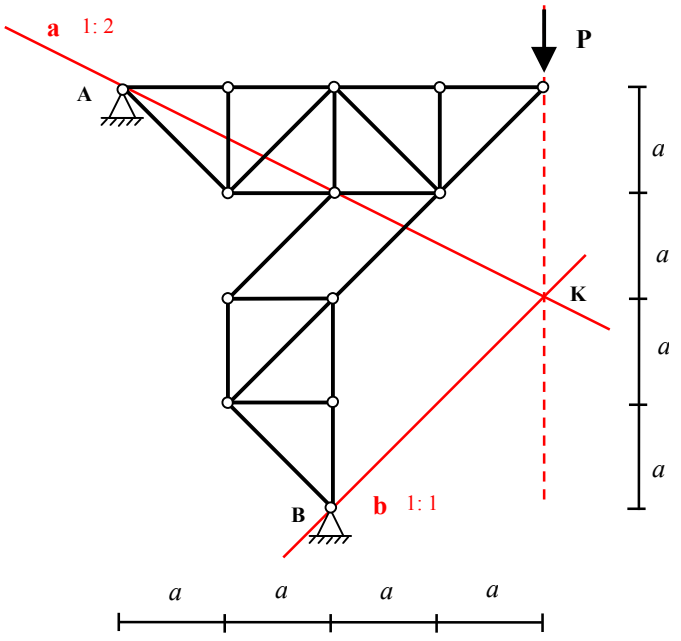
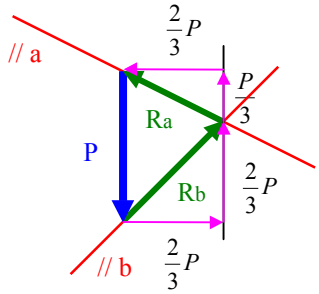
Risolvere la seguente struttura reticolare



Svolgimento :

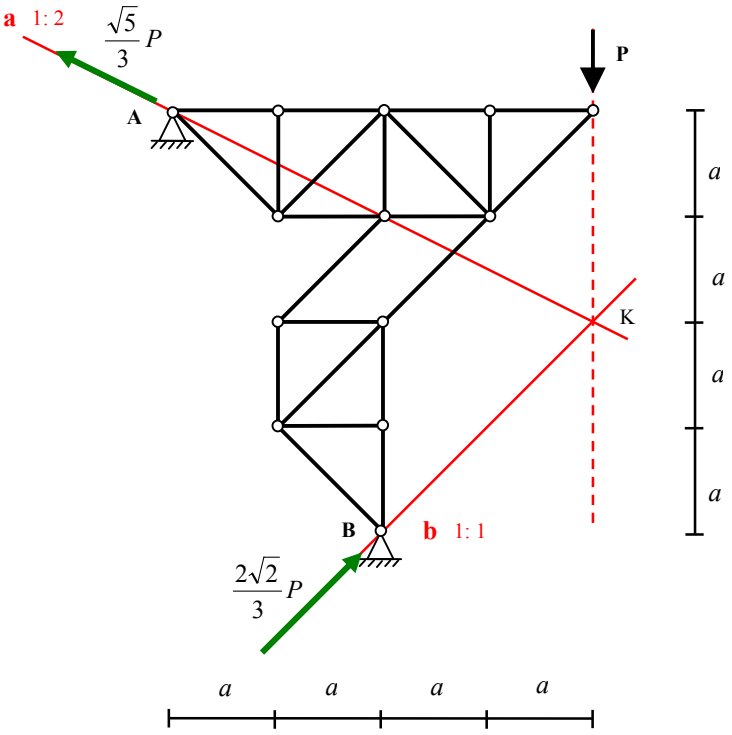
Per il calcolo delle reazioni vincolari applichiamo il metodo grafico



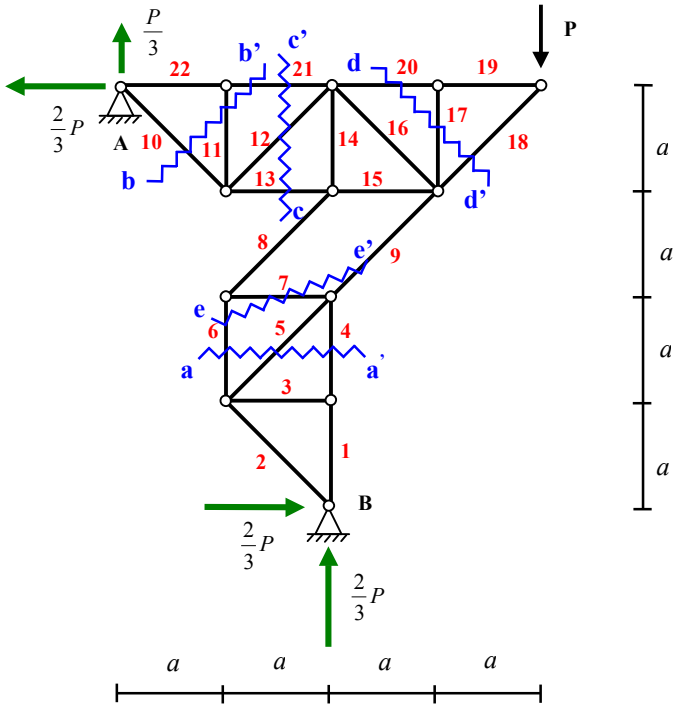


$$R_a = \frac{\sqrt{5}P}{3} \qquad R_b = \frac{2\sqrt{2}P}{3}$$

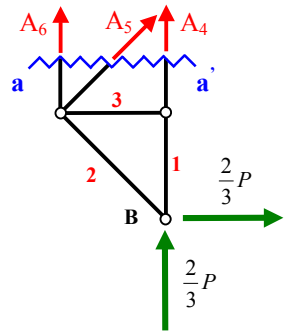
Si ha quindi per il sistema equilibrato :



Utilizzando il metodo di Ritter indichiamo le sezioni che portano alla determinazione delle corrispondenti aste , riportando in seguito il calcolo dell'equilibrio dei nodi per le restanti aste:



Calcolo delle aste 4 , 5 e 6 mediante sezione ***aa'*** si ha :

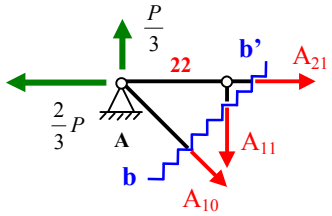


$$\sum M_{(A_5 \cap A_4)}: \quad -A_6 \cdot a + \frac{2}{3}P \cdot 2a = 0 \quad \Rightarrow \quad A_6 = +\frac{4}{3}P$$

$$\sum M_{(A_6 \cap A_5)}: \quad +A_4 \cdot a + \frac{2}{3}P \cdot a + \frac{2}{3}P \cdot a = 0 \quad \Rightarrow \quad A_4 = -\frac{4}{3}P$$

$$\sum (aa'): \quad +\frac{A_5}{\sqrt{2}} + \frac{2}{3}P = 0 \quad \Rightarrow \quad A_5 = -\frac{2\sqrt{2}}{3}P$$

Calcolo delle aste 10 , 11 e 21 mediante sezione ***bb'*** si ha :

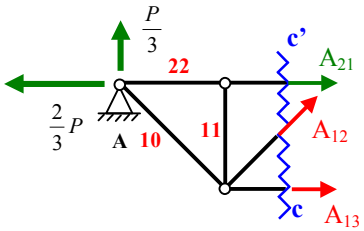


$$\sum M_{(A_{10} \cap A_{21})}: \quad -A_{11} \cdot a = 0 \quad \Rightarrow \quad A_{11} = 0$$

$$\sum M_{(A_{10} \cap A_{11})}: \quad -A_{21} \cdot a + \frac{2}{3}P \cdot a - \frac{P}{3} \cdot a = 0 \quad \Rightarrow \quad A_{21} = +\frac{P}{3}$$

$$\sum M_{(A_{11} \cap A_{21})}: \quad +A_{10}\frac{\sqrt{2}}{2} \cdot a - \frac{P}{3} \cdot a = 0 \quad \Rightarrow \quad A_{10} = +\frac{\sqrt{2}}{3}P$$

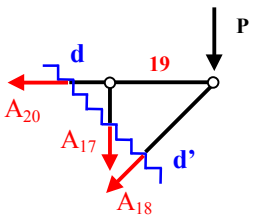
Calcolo delle aste 12 e 13 mediante sezione ***cc'*** si ha :



$$\sum M_{(A_{21} \cap A_{12})}: \quad +A_{13} \cdot a - \frac{P}{3} \cdot 2a = 0 \quad \Rightarrow \quad A_{13} = +\frac{2}{3}P$$

$$\sum V(cc'): \quad +\frac{A_{12}}{\sqrt{2}} + \frac{P}{3} = 0 \quad \Rightarrow \quad A_{12} = -\frac{\sqrt{2}}{3}P$$

Calcolo delle aste 17 , 18 e 20 mediante sezione ***dd'*** si ha :

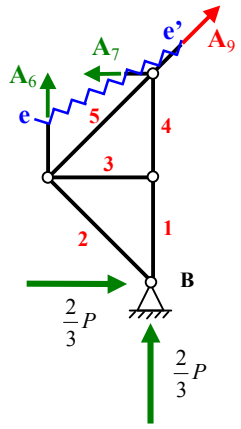


$$\sum M_{(A_{20} \cap A_{17})}: \quad -A_{18}\frac{\sqrt{2}}{2} \cdot a - P \cdot a = 0 \quad \Rightarrow \quad A_{18} = -P\sqrt{2}$$

$$\sum M_{(A_{17} \cap A_{18})}: \quad +A_{20} \cdot a - P \cdot a = 0 \quad \Rightarrow \quad A_{20} = +P$$

$$\sum M_{(A_{18} \cap A_{20})}: \quad +A_{17} \cdot a = 0 \quad \Rightarrow \quad A_{17} = 0$$

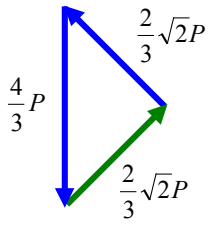
Calcolo dell' asta 9 mediante sezione ***ee'*** si ha :



$$\sum M_{(A_6 \cap A_7)}: \quad + A_9 \cdot \frac{\sqrt{2}}{2} a + \frac{2}{3} P \cdot 2a + \frac{2}{3} P \cdot a = 0 \quad \Rightarrow \quad A_9 = -2\sqrt{2} P$$

Per il calcolo delle altre aste applichiamo il metodo grafico dell'equilibrio dei nodi:

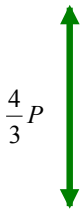
Determinazione asta 1 e 2 :



$$A_1 = -\frac{4}{3} P$$

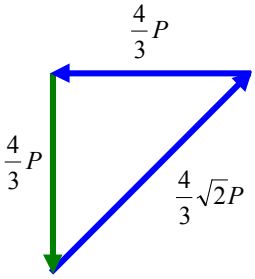
$$A_2 = +\frac{2\sqrt{2}}{3} P$$

Determinazione asta 3 :



$$A_3 = 0$$

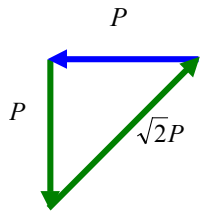
Determinazione aste 7 e 8 :



$$A_7 = -\frac{4}{3} P$$

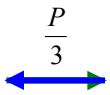
$$A_8 = +\frac{4\sqrt{2}}{3} P$$

Determinazione asta 19 :



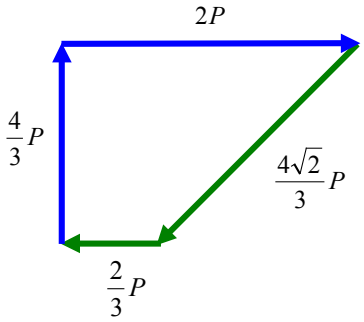
$$A_{19} = +P$$

Determinazione asta 22 :



$$A_{22} = +\frac{P}{3}$$

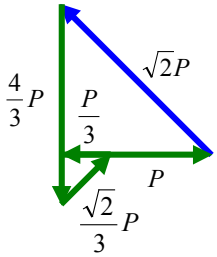
Determinazione aste 14 e 15 :



$$A_{14} = +\frac{4}{3}P$$

$$A_{15} = +2P$$

Determinazione asta 16 :



$$A_{16} = -\sqrt{2}P$$

Riassumendo i valori ottenuti per le singole aste :

ASTE	TIRANTE	PUNTONE
1		$\frac{4}{3}P$
2	$\frac{2\sqrt{2}}{3}P$	
3	/	/
4		$\frac{4}{3}P$
5		$\frac{2}{3}\sqrt{2}P$
6	$\frac{4}{3}P$	
7		$\frac{4}{3}P$
8	$\frac{4\sqrt{2}}{3}P$	
9		$2\sqrt{2}P$
10	$\frac{\sqrt{2}}{3}P$	
11	/	/
12		$\frac{\sqrt{2}}{3}P$
13	$\frac{2}{3}P$	
14	$\frac{4}{3}P$	
15	$2P$	
16		$\sqrt{2}P$
17	/	/
18		$\sqrt{2}P$
19	P	
20	P	
21	$\frac{P}{3}$	
22	$\frac{P}{3}$	