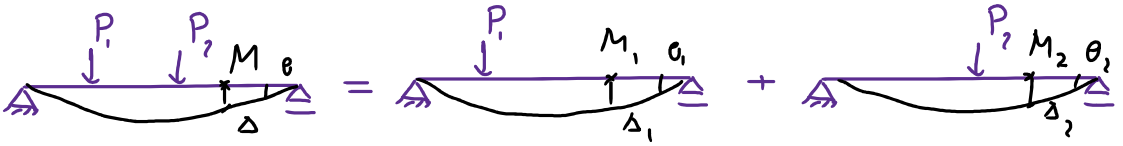
Truss

Thursday, November 2, 2023 12:36

روش عضو جایگزین (روش هنبرگ)

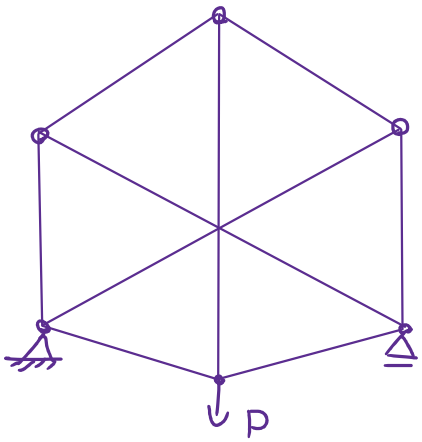
روش عضو جایگزین در سال ۱۸۸۶ برای تحلیل خرپا توسط هنبرگ ارائه شد. این روش بر اصل جمع آثار قوا (اصل سوپرپوزیشن) استوار است.

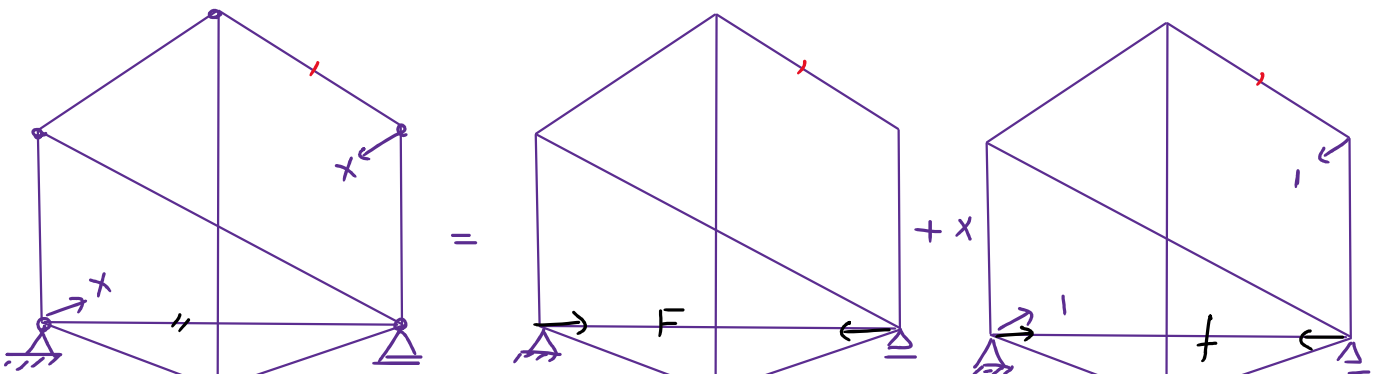
اصل جمع آثار قوا (سوپرپوزیشن)

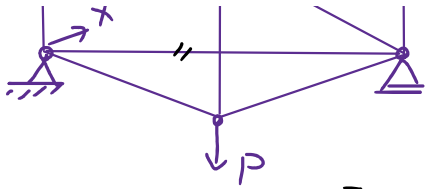


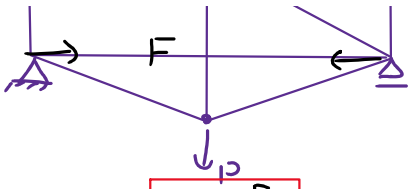
$$\begin{cases} M = M_1 + M_2 \\ \Delta = \Delta_1 + \Delta_2 \\ v = v_1 + v_2 \\ \vdots \end{cases}$$

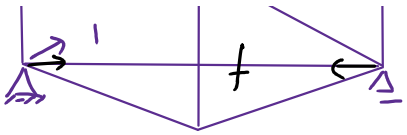
* فقط در محدوده خطی صحیح است.





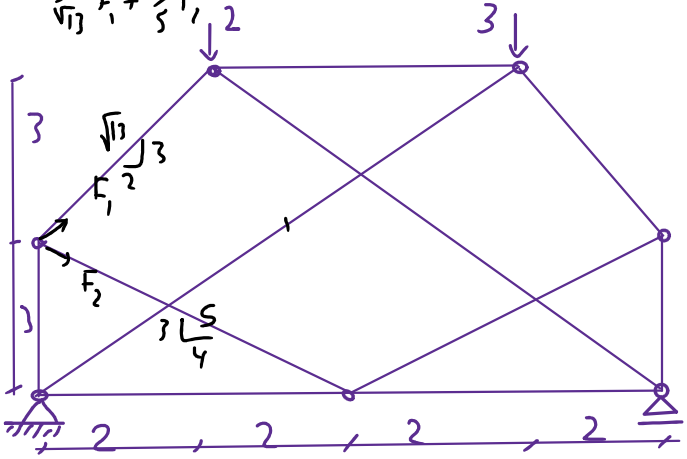


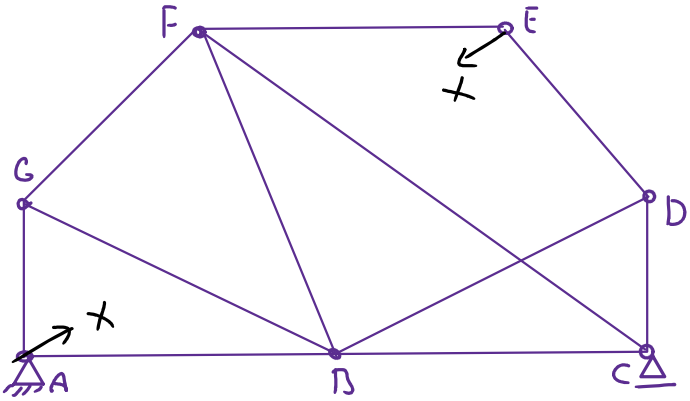


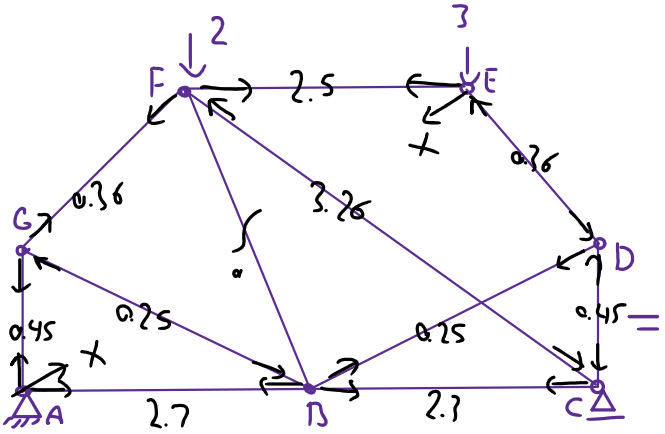


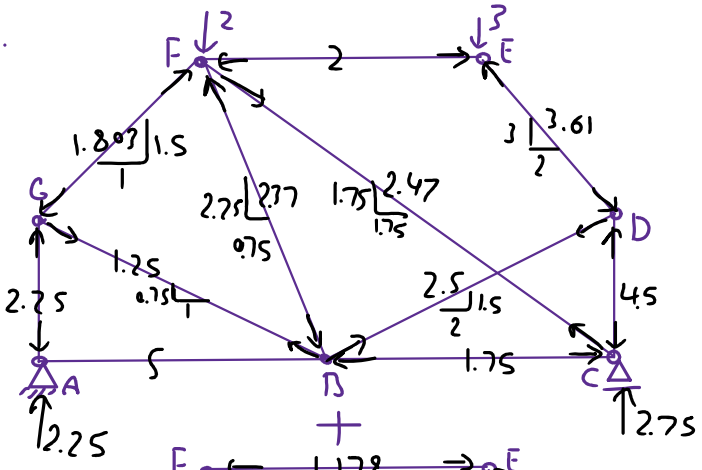
$$F + X f = 0 \longrightarrow \boxed{X = -\frac{F}{f}}$$

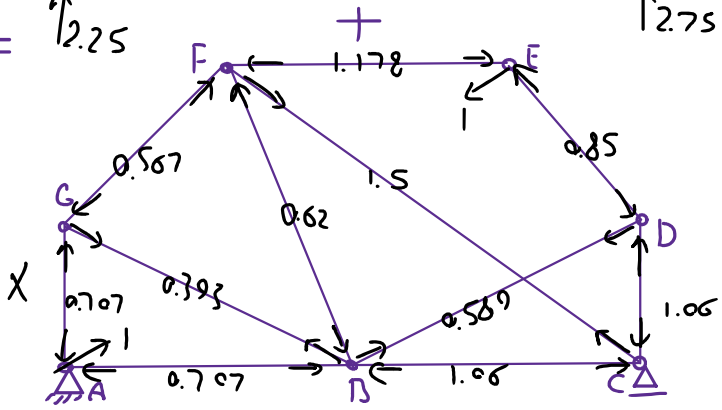
مثال :





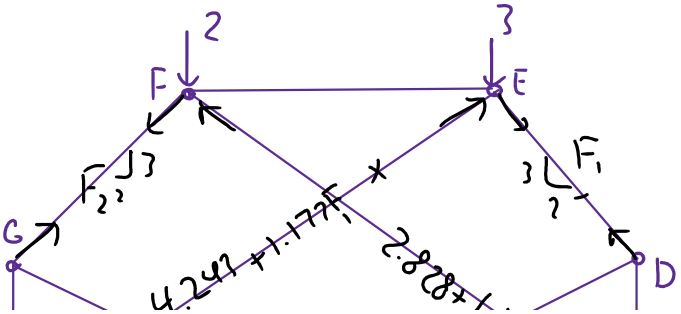


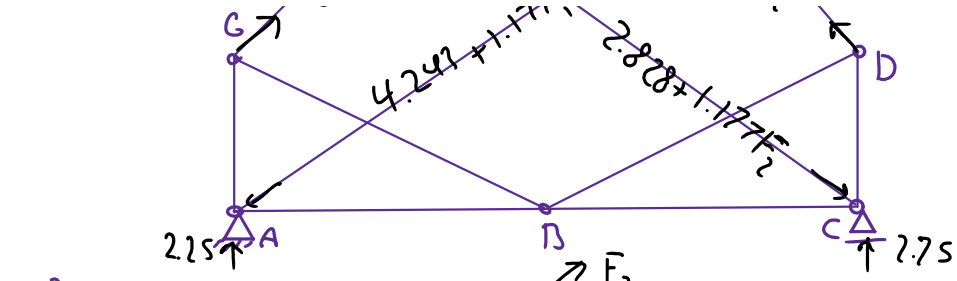




$$-2.37 + X(-0.62) = 0$$

$$\boxed{X = -3.823}$$

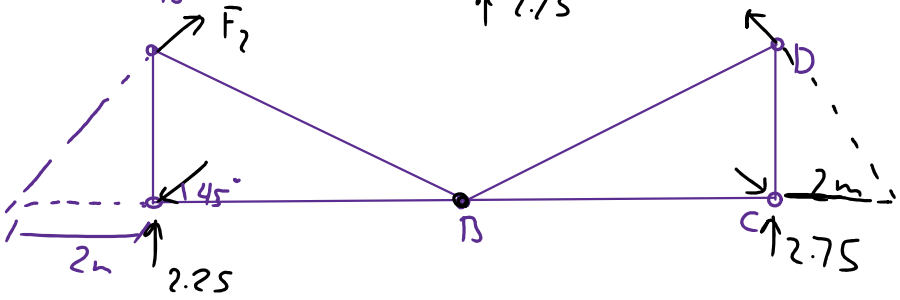




$$\frac{\sqrt{2}}{2}x - \frac{3}{\sqrt{13}}F_1 - \frac{3}{2} = 0$$

$$x = 4.243 + 1.177F_1$$

2.828



$$* \quad 2.75 \times 4 - \frac{\sqrt{2}}{2}(2.828 + 1.177F_2) \times 4 + \frac{3}{\sqrt{13}}F_1 \times 6 = 0$$

$\Sigma M_B =$

$$2.25 \times 4 - \frac{\sqrt{2}}{2}(4.243 + 1.177F_1) \times 4 + \frac{3}{\sqrt{13}}F_2 \times 6 = 0$$

3.329 | $4.992F_2 - 3.329F_1 = 3.001$

4.992 | $-3.329F_2 + 4.992F_1 = -3.001$

$\rightarrow \quad (-3.329^2 + 4.992^2)F_1 =$

$3.001(3.329 - 4.992) \rightarrow \boxed{F_1 = -0.361}$

$F_2 = 0.361$