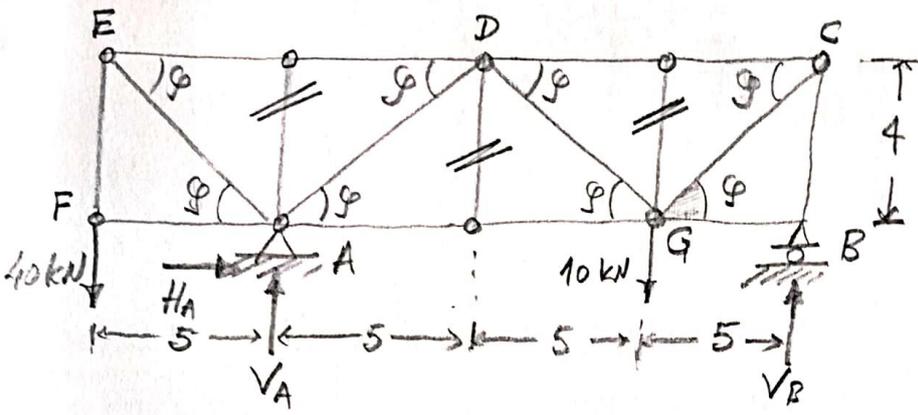


Άσκηση 6

Κατά την πάθηση μελετώντας
 ούτως (3 κομμάτια, οι 2
 υποστηρίξεις, 65 κόμβοι αρθρώσεων)



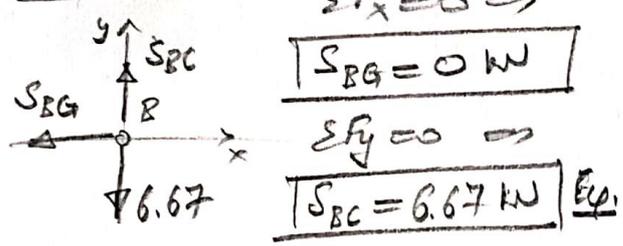
Επίπεδο 16000000 (3
 μέτρα μήκος, 3 εφ. αρθρ.)
 Στάσις άρθρας (οι αρθρώσεις
 αρθρώσεων και όχι διατάξεις)
Εγκύριση 1 κομμάτι $P_{FG} = 2k-3$
 Στάσις άρθρας γοφών ως
 διατάξεις αρθρώσεων (αυτά είναι)

Γωνία: $\varphi = \tan^{-1} \frac{4}{5} = 38,66^\circ$, $\sin \varphi = 0,625$, $\cos \varphi = 0,781$

Αντιστάσεις συνιστώσες:

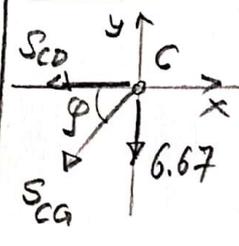
$\sum F_x = 0 \Rightarrow H_A = 0$
 $(\sum M_A = 0 \Rightarrow 5 \cdot 40 - 10 \cdot 10 + 15 V_B = 0 \Rightarrow V_B = -6,67 \text{ kN}) \downarrow$
 $\sum M_y = 0 \Rightarrow V_A - 40 - 10 - 6,67 = 0 \Rightarrow V_A = 56,67 \text{ kN}$

Κόμβος B



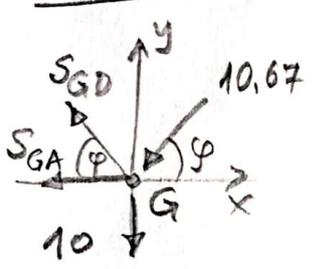
$\sum F_x = 0 \Rightarrow S_{BG} = 0 \text{ kN}$
 $\sum F_y = 0 \Rightarrow S_{BC} = 6,67 \text{ kN}$ Εφ.

Κόμβος C



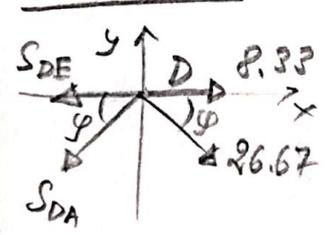
$\sum F_y = 0 \Rightarrow S_{CG} \sin \varphi = -6,67 \Rightarrow S_{CG} = -10,67 \text{ kN}$ Ο2.
 $\sum F_x = 0 \Rightarrow S_{CD} = -S_{CG} \cos \varphi \Rightarrow S_{CD} = +8,33 \text{ kN}$ Εφ.

Κόμβος G



$\sum F_y = 0 \Rightarrow S_{GD} \sin \varphi = 10 + 10,67 \sin \varphi \Rightarrow S_{GD} = \frac{10}{\sin \varphi} + 10,67 \Rightarrow S_{GD} = 26,67 \text{ kN}$ Εφ.
 $\sum F_x = 0 \Rightarrow S_{GA} = -10,67 \cos \varphi - S_{GD} \cos \varphi \Rightarrow S_{GA} = -29,16 \text{ kN}$ Ο1.

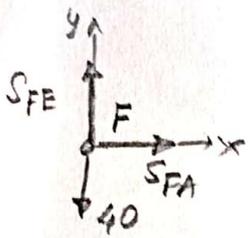
Κόμβος D



$\sum F_y = 0 \Rightarrow S_{DA} = -26,67 \text{ kN}$ Ο1.
 $\sum F_x = 0 \Rightarrow 8,33 + 26,67 \cdot \cos \varphi - (-26,67) \cos \varphi = S_{DE} \Rightarrow S_{DE} = 49,99 \text{ kN}$ Εφ.

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Κόμβος F



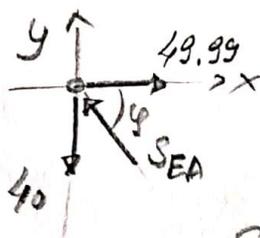
$$\sum F_x = 0 \Rightarrow$$

$$S_{FA} = 0 \text{ kN}$$

$$\sum F_y = 0 \Rightarrow$$

$$S_{FE} = 40 \text{ kN} \quad \text{Εφ.}$$

Κόμβος E



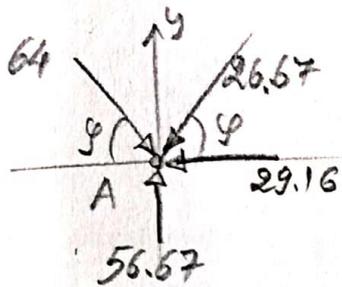
$$\sum F_y = 0 \rightarrow S_{EA} \sin \varphi = 40 \Rightarrow$$

$$\Rightarrow S_{EA} = 64 \text{ kN} \quad \text{Οδ.}$$

Ελέγχος, απειρα

$$S_{EA} \cos \varphi = 64 \cdot 0.78 \equiv 49.99 \quad \checkmark$$

Κόμβος A (κόμβος συνιστά ελέγχου)



$$\begin{aligned} \sum F_x &= 64 \cos \varphi - 29.16 - 26.67 \cos \varphi = \\ &= 49.99 - 29.16 - 20.83 = 0 \quad \checkmark \end{aligned}$$

$$\begin{aligned} \sum F_y &= 56.67 - 64 \sin \varphi - 26.67 \sin \varphi = \\ &= 56.67 - 40 - 16.67 = 0 \quad \checkmark \end{aligned}$$