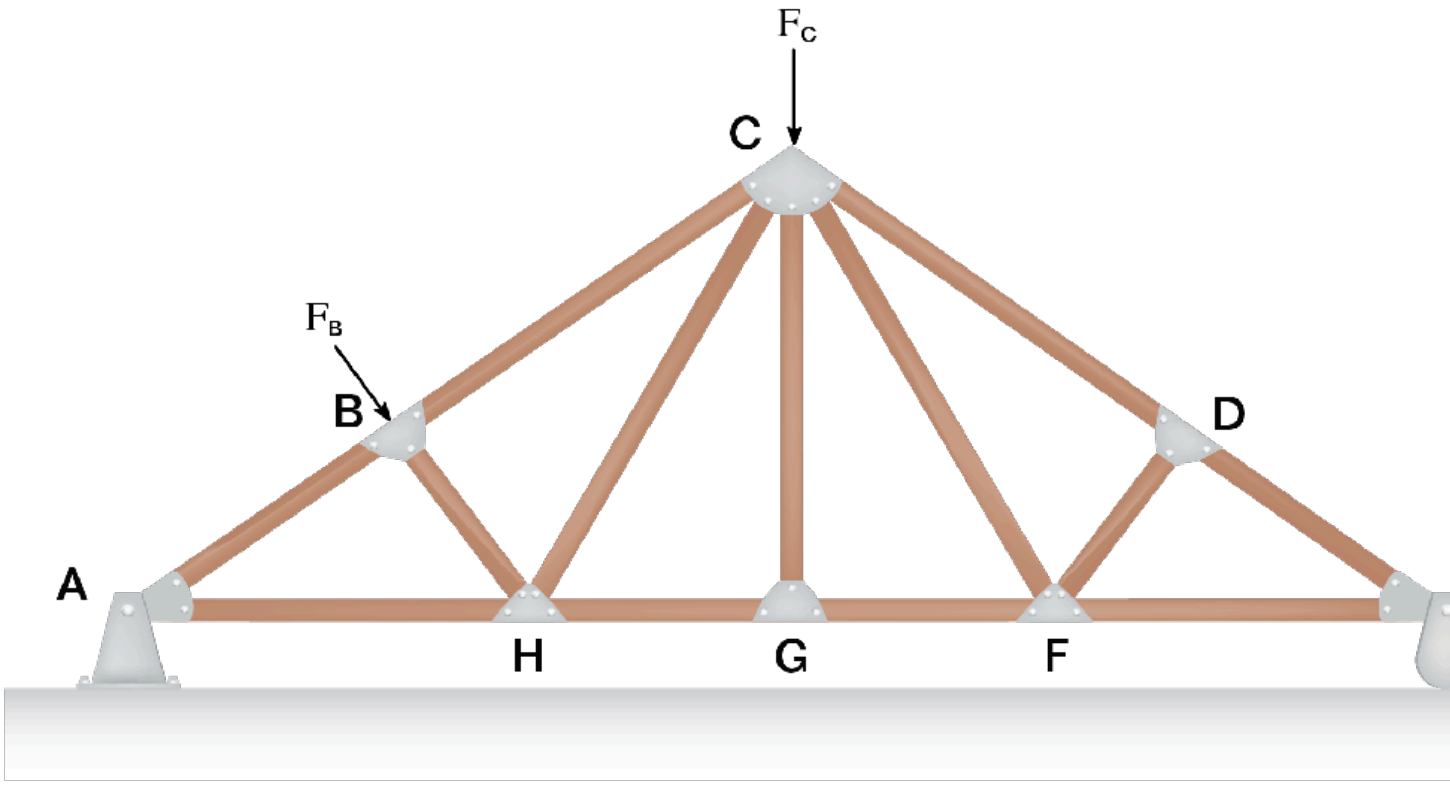

A *Fink roof truss* supports two loads F_B and F_C as shown above. Using the method of joints, find all the zero-force members in the truss. Assume all joints are pin connected.

A force is tensile if > 0 and compressive if < 0

$+\uparrow \Sigma G_y = 0 \rightarrow F_{CG} = 0$

$+\swarrow \Sigma D_x = 0 \rightarrow F_{DF} = 0$

$+\uparrow \Sigma F_y = 0 \rightarrow F_{CF_y} + F_{DF_y} = 0 \rightarrow F_{CF} = 0$

$+\searrow \Sigma B_x = 0 \rightarrow F_{BH} + F_B = 0 \rightarrow F_{BH} = -F_B < 0$

$+\uparrow \Sigma H_y = 0 \rightarrow F_{BH_y} + F_{CH_y} = 0 \rightarrow F_{CH_y} = -F_{BH_y} > 0 \rightarrow F_{CH} > 0$

Viewing the truss as a rigid body, since F_B has a horizontal component, it can be determined that $A_x < 0$, $A_y > 0$, $E_y > 0$

$+\uparrow \Sigma E_y = 0 \rightarrow F_{DE_y} + E_y = 0 \rightarrow F_{DE_y} = -E_y < 0 \rightarrow F_{DE} < 0$

Since they are collinear, $F_{CD} = F_{DE} < 0$

$+\rightarrow \Sigma E_x = 0 \rightarrow F_{DE_x} - F_{EF} = 0 \rightarrow F_{EF} = F_{DE_x} > 0$

Since they are collinear, $F_{FG} = F_{GH} = F_{EF} > 0$

$+\uparrow \Sigma A_y = 0 \rightarrow F_{AB_y} + A_y = 0 \rightarrow F_{AB_y} = -A_y < 0 \rightarrow F_{AB} < 0$

Since they are collinear, $F_{BC} = F_{AB} \neq 0$

$+\rightarrow \Sigma H_x = 0 \rightarrow F_{BH_x} + F_{CH_x} + F_{GH} - F_{AH} = 0 \rightarrow F_{AH} = F_{BH_x} + F_{CH_x} + F_{GH} > 0$ (Since all three components are > 0)

Zero-force members:

CG, DF, CF