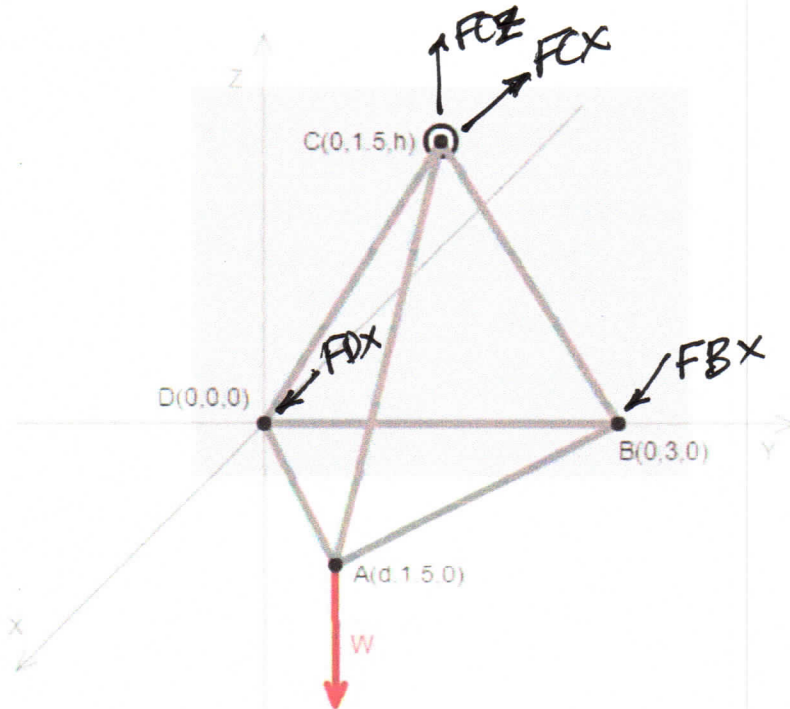


SOLUTION**ip4STATICS Worksheet for U04\_3d\_P04**

A simple space truss supports weight  $W$  at point A. The truss is maintained in equilibrium by wall forces at B, C, and D. Forces at B and D are normal to the wall. The ball joint at C allows for a general force but no moment.

Instance variables: force  $W$  in lbs; lengths  $d$  and  $h$  in ft.



Note. No  $y$  components of forces due to symmetry.

- (1) What is the resultant force  $FC(i,j,k)$ ?
- (2) What is the resultant force  $FB(i,j,k)$ ?
- (3) What is the resultant force  $FD(i,j,k)$ ?

$$\sum F_x = 0 : FC_x = 2 \cdot FB_x$$

$$\sum F_y = 0 : FC_y = 0$$

$$\sum F_z = 0 : FC_z = W$$

$$\sum M_{yx} = 0 : h \cdot |FC_x| = d \cdot W ; FC_x = \left(\frac{d}{h}\right)W$$

$$(1) FC = \left(\frac{d}{h}W\right)\bar{i} + (0)\bar{j} + (W)\bar{k}$$

U04-3d-P04

SOLUTION p.2

$$F_{Bx} = \left(\frac{1}{2}\right) |F_{Cx}| = \left(\frac{Ad}{2h}\right) W$$

$$F_{By} = 0$$

$$F_{Bz} = 0$$

$$(2) \quad \vec{F}_B = \left(\frac{d \cdot W}{2h}\right) \vec{i} + (0) \vec{j} + (0) \vec{k}$$

$$(3) \quad F_D = F_B \quad \text{by symmetry.}$$