Solutions: 21-5-3.4-MK-02.pg

$m = 11\ kg$
$h = 3\ m$

$a = (0, 0, 3)$
$b = (3, 4, 4)$
$c = (-6, -3, 6)$
$d = (4, -3, 4)$

$\vec{AB} = (3, 4, 1)$
$\vec{AC} = (-6, -3, 3)$
$\vec{AD} = (4, -3, 1)$

$|\vec{AB}| = \sqrt{3^2 + 4^2 + 1^2} = \sqrt{26} = 5.10\ m$

$|\vec{AC}| = \sqrt{-6^2 + (-3)^2 + 3^2} = 3\sqrt{6} = 7.35\ m$

$|\vec{AD}| = \sqrt{4^2 + (-3)^2 + 1^2} = \sqrt{26} = 5.10\ m$

$\vec{u}_{AB} = 0.588\,\hat{i} + 0.784\,\hat{j} + 0.196\,\hat{k}$

$\vec{u}_{AC} = -0.816\,\hat{i} + 0.408\,\hat{j} + 0.408\,\hat{k}$

$\vec{u}_{AD} = 0.784\,\hat{i} - 0.588\,\hat{j} + 0.196\,\hat{k}$

$\Sigma F_x = 0.588\,f_{AB} - 0.816\,f_{AC} + 0.784\,F_{AD} = 0$

$\Sigma F_y = 0.784\,f_{AB} - 0.408\,f_{AC} - 0.588\,F_{AD} = 0$

$\Sigma F_z = 0.196\,f_{AB} + 0.408 F_{AC} + 0.196\,f_{AD} = (11\ kg)(9.81\ m/s)$

} system solver

$f_{AB} = 137.6\ N$
$f_{AC} = 165.3\ N$
$f_{AD} = 68.8\ N$