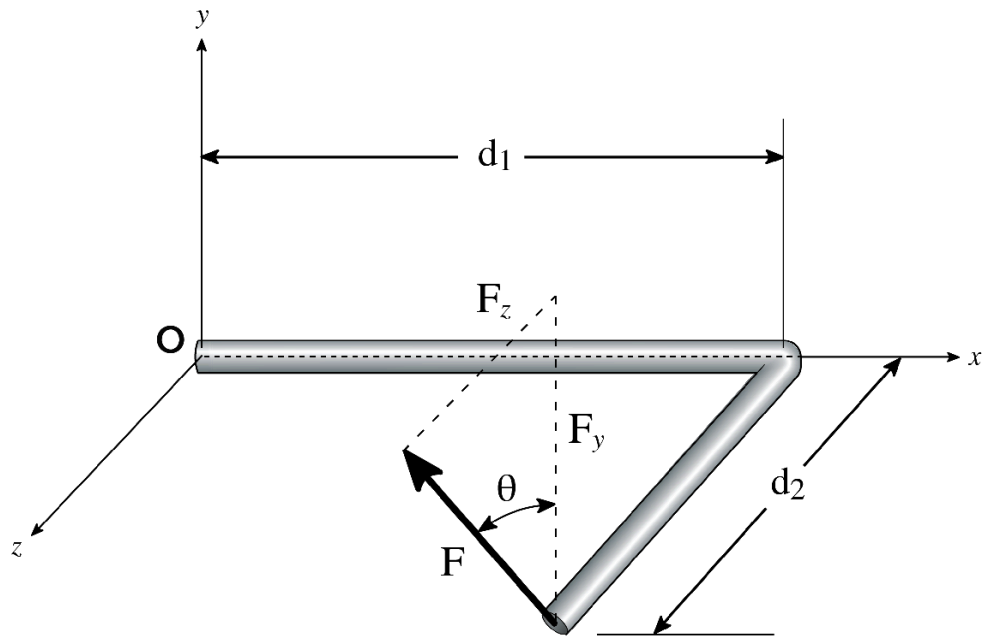

A force with magnitude F is applied to the end of a bent bar. Find the moment produced by the force about the origin O. Express the moment as a cartesian vector.

Express $\vec{r}$ and $\vec{F}$ as cartesian vectors.

$\vec{r} = d_1\hat{i} + d_2\hat{k}$

$r_x = d_1$

$r_y = 0$

$r_z = d_2$

$\vec{F} = F\cos\theta\hat{j} + F\sin\theta\hat{k}$

$F_x = 0$

$F_y = F\cos\theta$

$F_z = F\sin\theta$

Express the resulting moment as a cartesian vector.

$$M_x = -d_2 F_y = -d_2 F \cos\theta$$

$$M_y = -d_1 F_z = -d_1 F \sin\theta$$

$$M_z = d_1 F_y = d_1 F \cos\theta$$