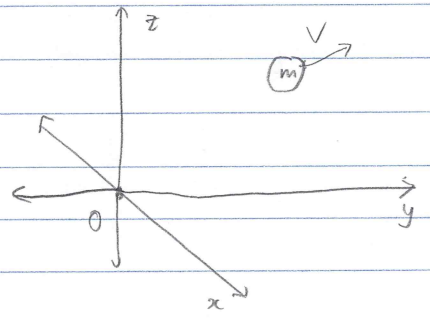
20-P-MOM-DY-19

A 3 kg particle is $d = 2\hat{i} + 1\hat{j} + 3\hat{k}$ away from point O. If the particle has the velocity $v = 2\hat{i} + 3\hat{j} + 2\hat{k}$, determine the angular momentum of the particle about O.



Solution

$$H_o = r \times mv = 3 \begin{vmatrix} i & j & k \\ 2 & 1 & 3 \\ 2 & 3 & 2 \end{vmatrix} = 3\left[(2-9)\hat{i} - (4-6)\hat{j} + (6-2)\hat{k}\right]$$

$$= -21\hat{i} + 6\hat{j} + 12\hat{j} \quad kg \cdot \frac{m^2}{s}$$