## Problem 6:

$$
\begin{equation*}
\mathbf{L}=\mathbf{r} \times \mathbf{p}=m \mathbf{r} \times \mathbf{v} \tag{1}
\end{equation*}
$$

Using in Eq.(1) that $\mathbf{v}=\omega \times \mathbf{r}$ we obtain:

$$
\begin{equation*}
\mathbf{L}=m \mathbf{r} \times \omega \times \mathbf{r} \tag{2}
\end{equation*}
$$

Using equation (3.18) in the book,

$$
\begin{gather*}
\mathbf{L}=m[\omega(\mathbf{r} . \mathbf{r})-\mathbf{r}(\mathbf{r} \cdot \omega)]=m\left[r^{2} \omega-r^{2} \hat{\mathbf{r}}(\hat{\mathbf{r}} \cdot \omega)\right]= \\
m r^{2}[\omega-\hat{\mathbf{r}}(\hat{\mathbf{r}} . \omega)] \tag{3}
\end{gather*}
$$

