Homework #1

Problem 6:

$$\mathbf{L} = \mathbf{r} \times \mathbf{p} = m\mathbf{r} \times \mathbf{v}. \tag{1}$$

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

$$\mathbf{L} = m\mathbf{r} \times \omega \times \mathbf{r}. \tag{2}$$

Using equation (3.18) in the book,

$$\mathbf{L} = m[\omega(\mathbf{r}.\mathbf{r}) - \mathbf{r}(\mathbf{r}.\omega)] = m[r^2\omega - r^2\hat{\mathbf{r}}(\hat{\mathbf{r}}.\omega)] =$$

$$mr^2[\omega - \hat{\mathbf{r}}(\hat{\mathbf{r}}.\omega)]. \tag{3}$$