

## 24.9: Relating Angular Momentum to Angular Velocity

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It's easy to check that the angular momentum vector is

$$L_i = I_{ij}\Omega_j$$

since

$$\mathbf{L} = \sum \vec{r}_n \times m_n \vec{v}_n = \sum m_n \vec{r}_n \times (\vec{\Omega} \times \vec{r}_n) = \vec{\Omega} \sum m_n r_n^2 - \sum m_n \vec{r}_n (\vec{\Omega} \cdot \vec{r}_n) = \mathbf{I} \vec{\Omega} \quad (24.9.1)$$

*Exercise:* verify this by putting in all the suffixes.

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