Answer on Question #73113-Physics-Other

Under what condition does the angular momentum and angular velocity point in the same direction?

Answer

The angular velocity is

$$\vec{\omega}$$

The angular momentum is

$$\vec{L} = I\vec{\omega}$$

I is the moment inertia tensor.

$$\vec{L} = I\vec{\omega} = k\vec{\omega}$$

k is real number, it is eigenvalue of I of corresponding eigenvector $\vec{\omega}$. Eigenvectors of the moment of inertia tensor are called the principal axes.

Thus, when body spins around a principal axis, the angular momentum and angular velocity point in the same direction.

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