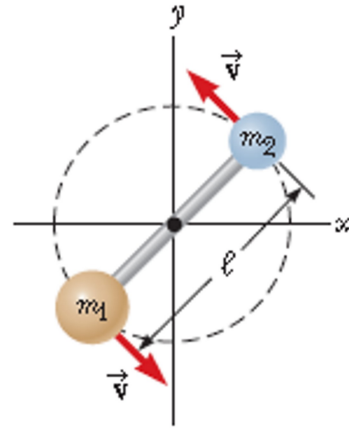


Angular momentum-magnitude

Friday, 29 January, 2021 21:38

A light, rigid rod of length $l = 1 \text{ m}$ joins two particles, with masses $m_1 = 4 \text{ kg}$ and $m_2 = 3 \text{ kg}$, at its ends. The combination rotates in the xy plane about a pivot through the center of the rod. Determine the angular momentum of the system about the origin when the speed of each particle is 5 m/s .



Angular momentum-vector

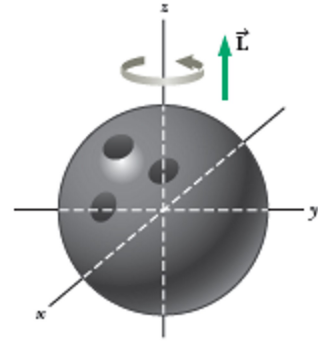
Saturday, 30 January, 2021 16:27

A 1.5 kg particle moves in the xy plane with a velocity of $\vec{v} = (4.2\hat{i} - 3.6\hat{j}) \text{ m/s}$. Determine the angular momentum of the particle about the origin when its position vector is $\vec{r} = (1.5\hat{i} + 2.2\hat{j}) \text{ m}$.

Bowling Ball

Saturday, 30 January, 2021 16:27

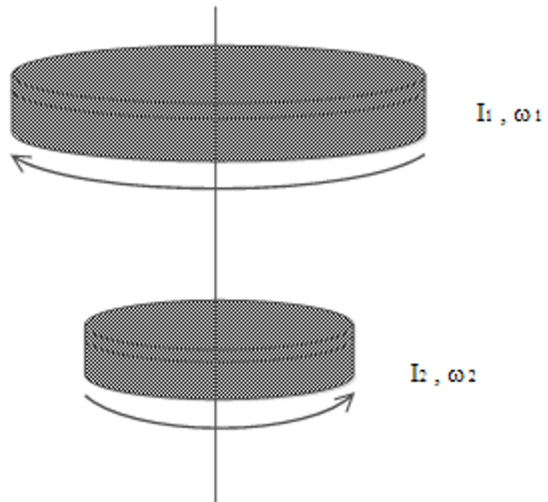
Estimate the magnitude of the angular momentum of a bowling ball spinning at 10 rev/s as shown. ($M = 7 \text{ kg}$), ($R = 12 \text{ cm}$) and ($I = \frac{2}{5}MR^2$)



Rotating wheels

Saturday, 30 January, 2021 16:28

Two wheels rotate as shown with ($\omega_1 = 2 \text{ rad/s}$ and $\omega_2 = 6 \text{ rad/s}$) and ($I_1=12 \text{ kg}\cdot\text{m}^2$ and $I_2=6 \text{ kg}\cdot\text{m}^2$). If the two wheels are suddenly connected to each other, determine the angular speed of the combination.



Formation of a Neutron Star

Saturday, 30 January, 2021 16:29

A star rotates with a period of 30 days about an axis through its center. The period is the time interval required for a point on the star's equator to make one complete revolution around the axis of rotation. After the star undergoes a supernova explosion, the stellar core, which had a radius of $1 \times 10^4 km$ collapses into a neutron star of radius $3 km$. Determine the period of rotation of the neutron star.