**Answer on Question #75030 Physics / Classical Mechanics**

A child of mass $m = 50$ kg is standing on the edge of a merry go round of mass $M = 250$ kg and radius $R = 3.0$ m which is rotating with an angular velocity of $\omega_i = 3.0$ rad $s^{-1}$. The child then starts walking towards the center of the merry go round. What will be the final angular velocity of the merry go round when the child reaches the center?

**Solution:**

Using the law of angular momentum conservation, we get

$$I_i\omega_i = I_f\omega_f$$

Here

$$I_i = \frac{MR^2}{2} + mR^2$$

$$I_f = \frac{MR^2}{2}$$

Therefore

$$\left(\frac{MR^2}{2} + mR^2\right)\omega_i = \frac{MR^2}{2}\omega_f$$

$$\omega_f = \frac{\left(\frac{MR^2}{2} + mR^2\right)\omega_i}{\frac{MR^2}{2}} = \left(1 + \frac{2m}{M}\right)\omega_i$$

$$\omega_f = \left(1 + \frac{2 \times 50}{250}\right) \times 3.0 = 4.2 \text{ rad/s}$$

**Answer:** 4.2 rad/s