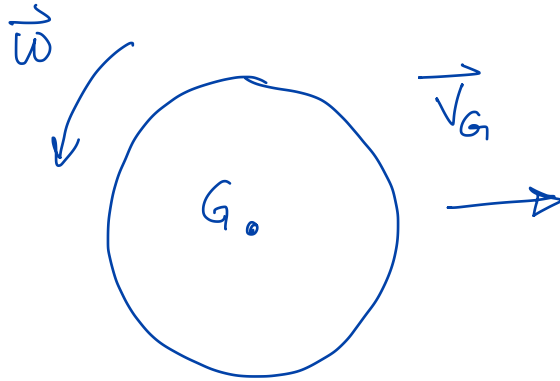


A 165 g frisbee that is 30 cm in diameter is thrown at a linear velocity of 3 m/s. The frisbee has an angular velocity of 6.2 rad/s. What is the total kinetic energy of the frisbee? Assume the frisbee is a thin disc with constant density.



Find KE



$$\begin{aligned}
 KE &= \frac{1}{2} m v_G^2 + \frac{1}{2} I_G \omega^2 \\
 &= \frac{1}{2} m v_G^2 + \frac{1}{2} \left(\frac{1}{2} m r^2 \right) \omega^2 \\
 &= \frac{1}{2} (0.165 \text{ kg}) (3 \text{ m/s})^2 \\
 &\quad + \frac{1}{4} (0.165 \text{ kg}) (0.15 \text{ m})^2 (6.2 \text{ rad/s})^2
 \end{aligned}$$

$$|\vec{v}_G| = 3 \text{ m/s}$$

$$|\vec{\omega}| = 6.2 \text{ rad/s}$$

$$m = 0.165 \text{ kg}$$

$$r = \frac{1}{2} (30 \text{ cm}) = 0.15 \text{ m}$$

$$I_G = \frac{1}{2} m r^2$$

$$KE = 0.778 \text{ J}$$