Answer on Question 49334, Physics, Mechanics | Kinematics | Dynamics

Question:

A fan blade is initially rotating at an angular speed of 48.6 rpm. It slows down and eventually comes to rest in a time of 32 seconds after turning through a total of 8.8 revolutions. Find the average angular velocity of the fan blade.

Solution:

By the definition of the average angular velocity:

$$\bar{\omega} = \frac{\Delta \theta}{\Delta t},$$

where $\bar{\omega}$ is the average angular velocity, $\Delta \theta$ is the angular displacement and Δt is the time. From this formula we obtain:

$$\bar{\omega} = \frac{8.8 rev \cdot \left(\dfrac{2\pi}{rev} \right)}{32 s} = 1.73 \frac{rad}{s}.$$

Answer:

Average angular velocity of the fan blade is $\bar{\omega} = 1.73 \dfrac{rad}{s}$.