

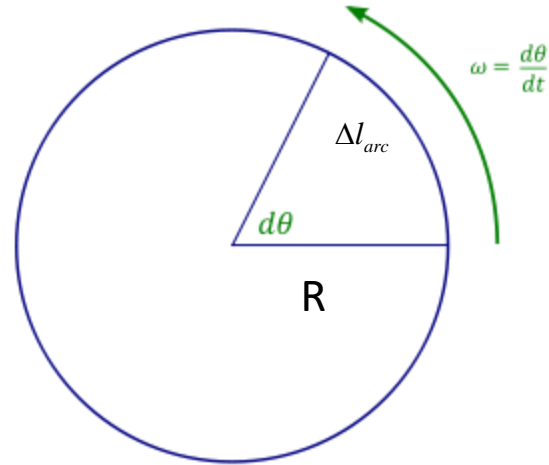
Rotational Motion

Angle (in radians): length of arc over radius

$$\Delta\alpha = \frac{\Delta l_{arc}}{R}$$

Angular velocity:

$$\omega = \frac{\Delta\alpha}{\Delta t}$$



It is related to regular (linear) speed of rotational motion as:

$$v = \frac{\Delta l_{arc}}{\Delta t} = \omega R$$

Homework

Problem 1

A propeller of regional airplane ATR-72 spins at 1200 RPM (revolutions per minute).

- a) Find the speed of propeller's tip with respect to the aircraft. Propeller radius is $R=2\text{m}$.
- b) Find the total speed of the propeller's tip with respect to air, if the speed of the airplane is $v=500\text{ km/hr}$.

Pay attention to directions of rotational and translational motion!

Problem 2

A boy is spinning a toy airplane on a string making one turn per second. The length of the string is 2 m. At some point, the string breaks. At what horizontal speed the toy will fly away from the boy?