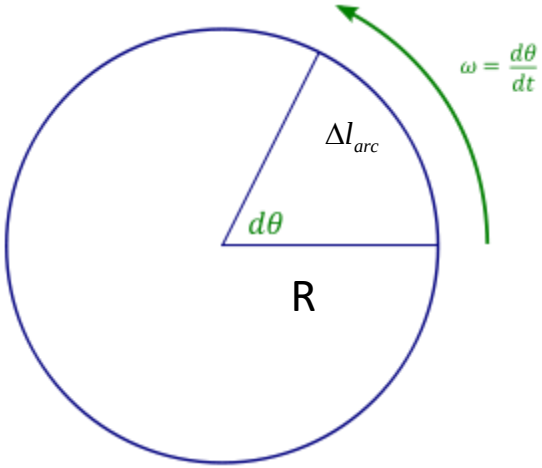
Rotational Motion

Angle (in radians): length of ark over radius

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



Angular velocity (units are 1/s):

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

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

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

Homework

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=2m. Don't forget to convert units of ω to 1/s

a) Find the total speed of the propeller's tip with respect to air, if the speed of the airplane is *v=500 km/hr.* **Pay attention to directions of rotational and translational motion!**