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$D_{wheel} := 70cm$ $\omega_0 := 130rpm$ $\omega_f := 280rpm$ $\Delta t := 4s$

$\Delta t = 0.067\,min$

Find : **angular acceleration**

SOLUTION :**constant acceleration**

$$\begin{pmatrix} \alpha & \omega_f & \omega_0 & \Delta\theta & \Delta t \\ "?" & 280rpm & 130rpm & \blacksquare & .067min \end{pmatrix}$$

$$\alpha := \frac{\omega_f - \omega_0}{\Delta t} \qquad \alpha = 2.25 \times 10^3 \frac{rev}{min^2} \qquad \text{or} \qquad \alpha = 0.625 \frac{rev}{sec^2}$$

a point on the wheel at $r_{wheel} := \frac{D_{wheel}}{2}$ at $\Delta t := 2s$ we must find the tangential and radial accelerations.

The tangential acceleration is responsible for changing the speed and is related to the angular acceleration but it must be expressed in radians/time^2

$$\alpha := 0.625 \cdot \frac{rev}{sec^2} \cdot 2\pi \frac{rad}{rev} \qquad \alpha = 3.927 \frac{rad}{s^2}$$

then $a_T := r_{wheel} \cdot \alpha$ $\quad a_T = 1.374 \frac{m}{s^2}$

The radial acceleration is responsible for charging the direction of the velocity and keeping it going in a circle. This is the centrepital acceleration.

We us the tangential acceleration to find the speed it is moving at if it started from rest. $v_0 := 0\frac{m}{s}$ and $\Delta t = 2\ s$ has elapsed

$$\begin{pmatrix} a & v_f & v_0 & \Delta s & \Delta t \\ 1.374\frac{m}{s^2} & "?" & 0 & \blacksquare & 2s \end{pmatrix}$$

$V_f := a_T \cdot \Delta t + v_0$ $\qquad V_f = 2.749\ \frac{m}{s}$

and then $\qquad a_r := \frac{V_f^2}{r_{wheel}}$ $\qquad a_r = 21.59\ \frac{m}{s^2}$