

## 26.1 Examples

1. A wind turbine has to be brought to a stop for maintenance. At the time the brakes are initially applied, the turbine is rotating at 2 radians per second. During the braking, the angular acceleration of the turbine is given by

$$\alpha = -0.015\sqrt{1 + 5t} \text{ rad/s}^2.$$

How long does it take for the turbine to come to a complete stop?

Recall that rotating objects have angular acceleration  $\alpha = \frac{d\omega}{dt}$ .

2. As a rocket burns, it consumes fuel and consequently gets lighter in mass. If a Saturn V rocket initially starts out with  $2 \times 10^6$  kg of fuel and the rate of change of the mass of fuel is given by

$$\frac{dm}{dt} = -t\sqrt{t^2 + 100} \text{ kg/s,}$$

how long does it take to burn all the fuel?

i.e. Find the value of  $t$  for which the mass of fuel is zero.