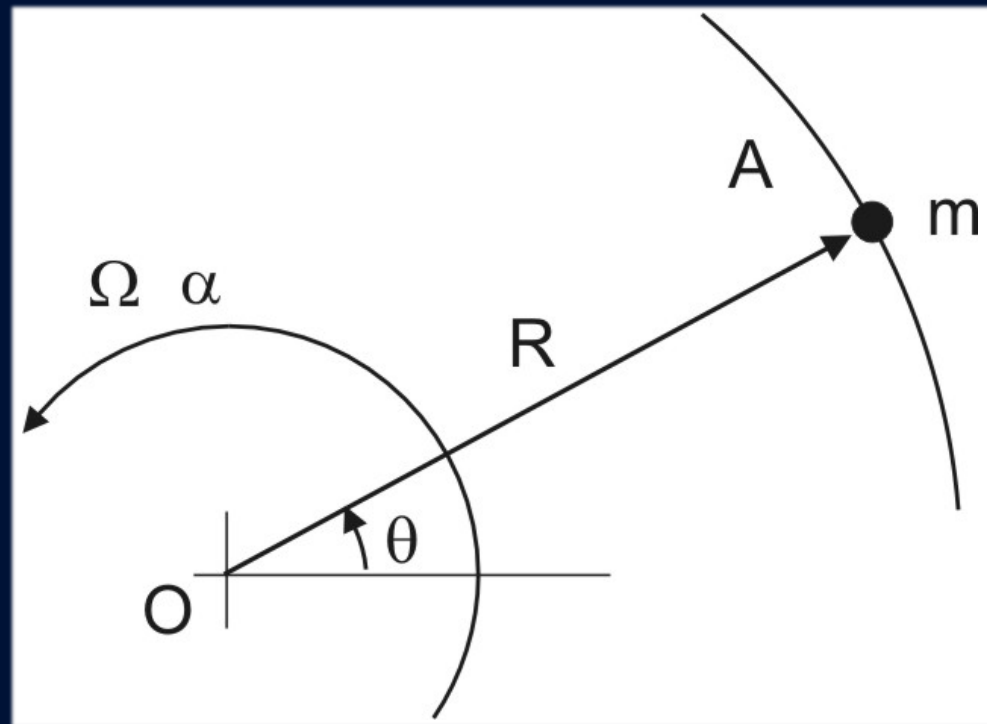


# Dynamics 2 (MECE08009)

## Particles in Circular Motion (Dynamics of Single Particles)

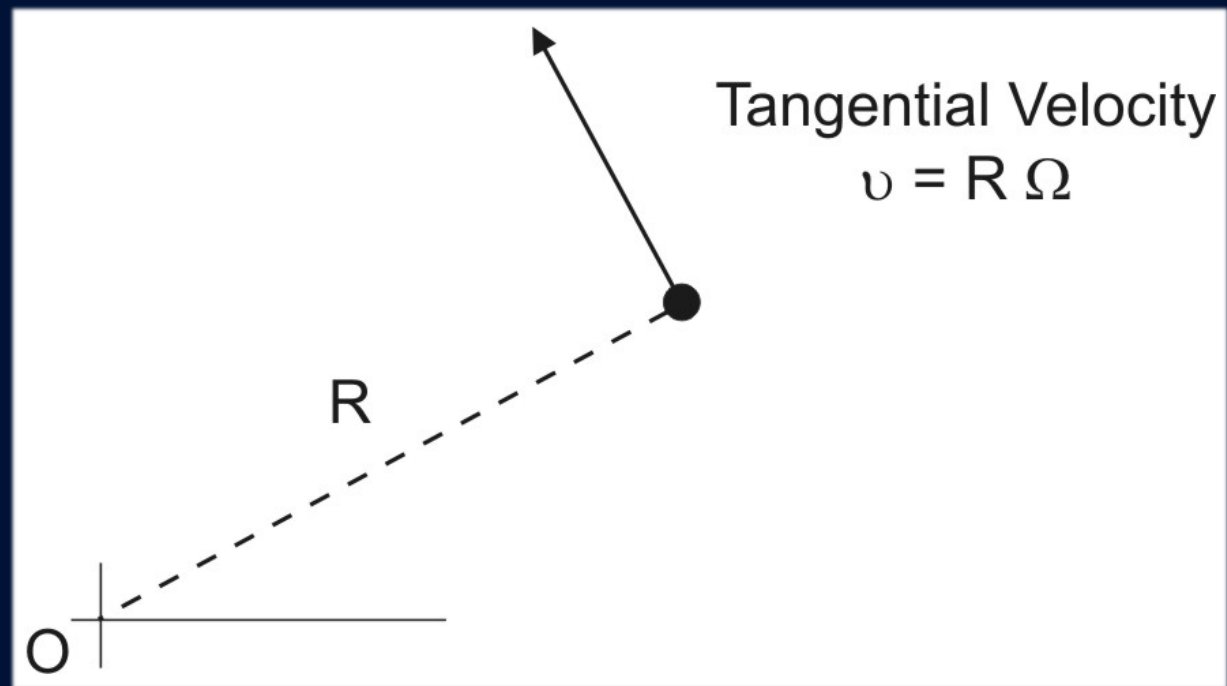
## Particles in Circular Motion

- for particle in a constant radius circular path
  - we can apply D'Alembert with familiar acceleration components, e.g.



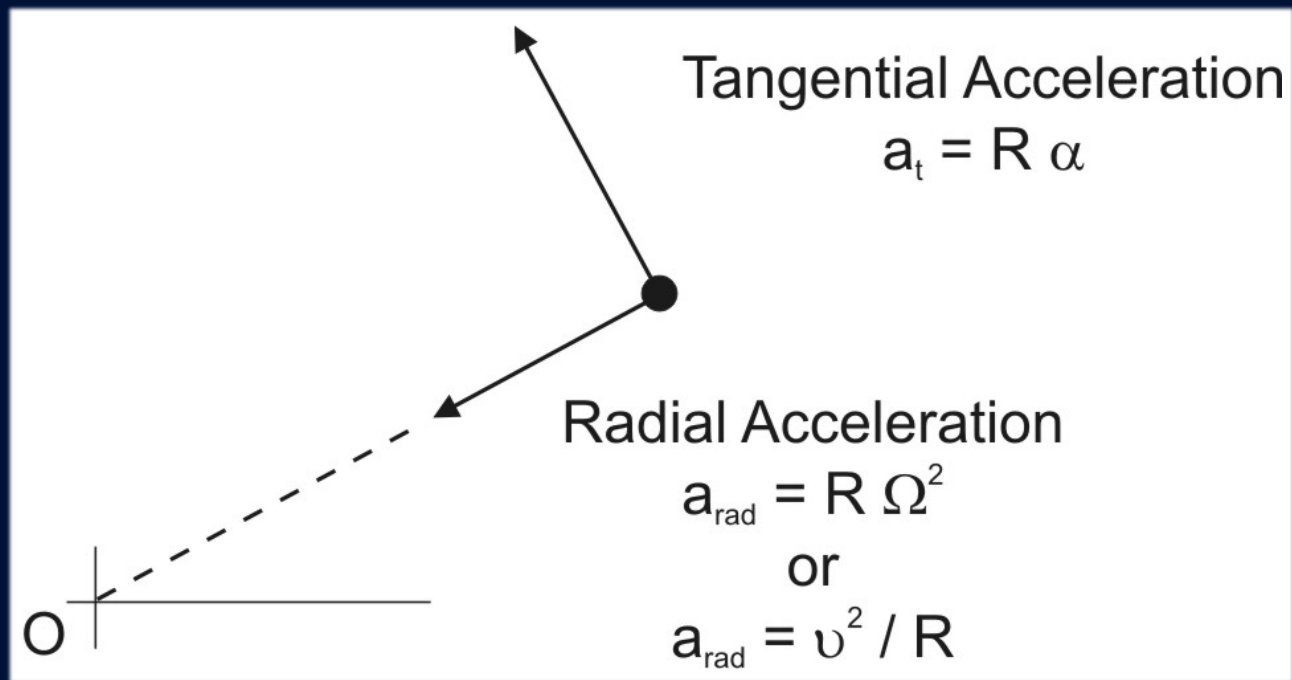
# Particles in Circular Motion

- Velocity components



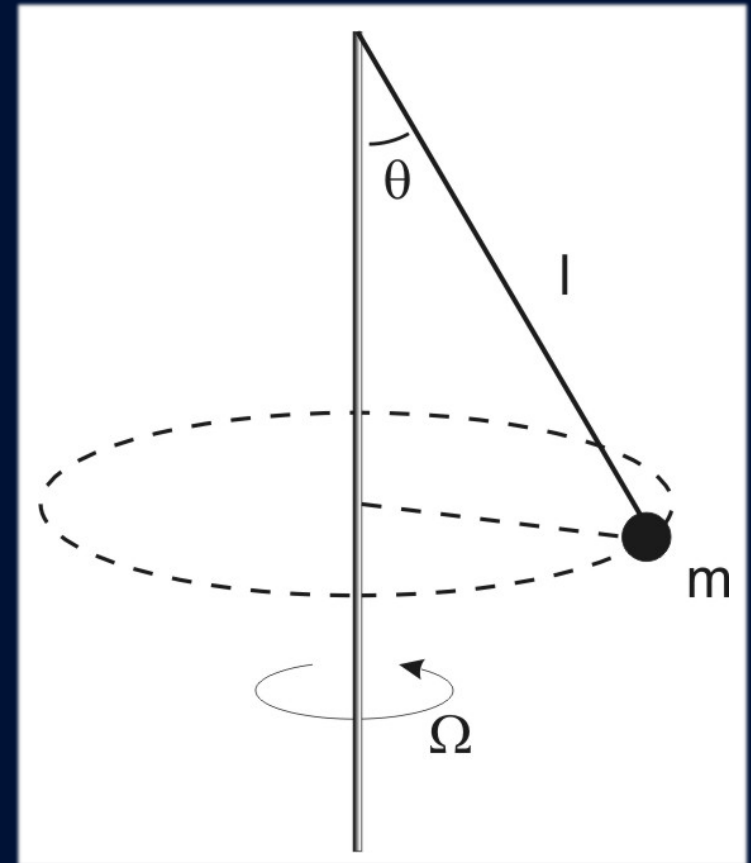
# Particles in Circular Motion

- Acceleration components



## Example 1.5

- rotating Pendulum
  - links mass to a rotating vertical shaft
  - at a steady rotational speed the wire adopts a steady angle
  - derive an expression for the wire angle?
  - draw its graph as a function of  $\Omega$



## Example 1.6

- a car test track has banked curves
  - banked at  $20^\circ$ , with 100 m mean radius
- at what speed can a 1 tonne car go round the bend without radial friction between road and wheel?

## Example 1.7

- what is your current velocity and acceleration due to the Earth's rotation?
- what is the approximate effect on your “weight” as measured by your bathroom scales?
- data:
  - Earth radius 3960 miles =  $6.37 \times 10^6$  m
  - latitude of Edinburgh  $56^\circ\text{N}$