# Lecture Module - Dynamics Review

ME3050 - Dynamic Modeling and Controls

Mechanical Engineering

Tennessee Technological University

## Topic 1 - Describing Motion

## Topic 1 - Describing Motion

- Translation
- Rotation
- Equations of Rotations
- Degrees of Freedom

# Translation

Translational motion is:

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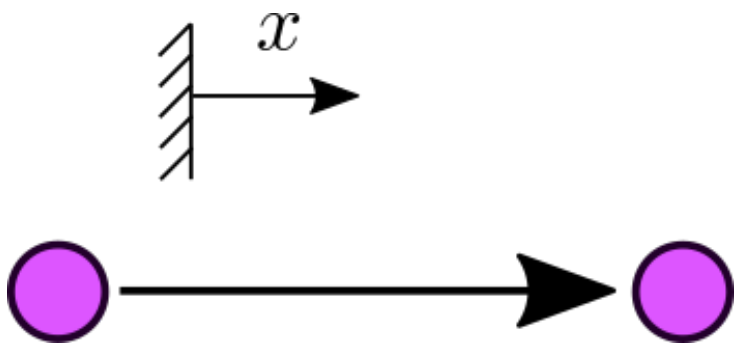
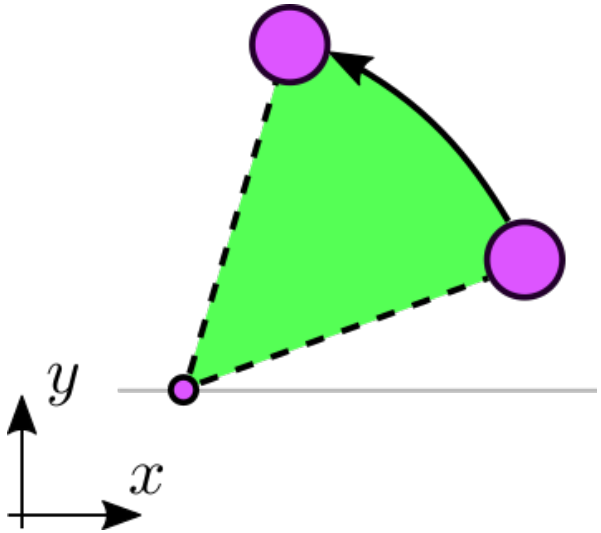
| | |
|---|---|
| Position | |
| Velocity | |
| Acceleration | |



# Rotation

Rotational motion is:

- motion along a circular path about a fixed point or axis
- acceleration towards the center of rotation




| | |
|---|---|
| Angular Position | |
| Angular Velocity | |
| Angular Acceleration | |

# Equations of Rotation

You used these important relationships in your dynamics course.

With the planar motion assumption this vector equation can be reduced to scalar equation.

# Degrees of Freedom

The Degrees of Freedom is

OR

The Degrees of Freedom is

# DOF Examples

Find the degrees of freedom for each of the following systems.

Wittener Metronome

Image: Wikipedia

Passenger Aircraft


Image: Wikipedia

Ackermann Steeting Mechanism

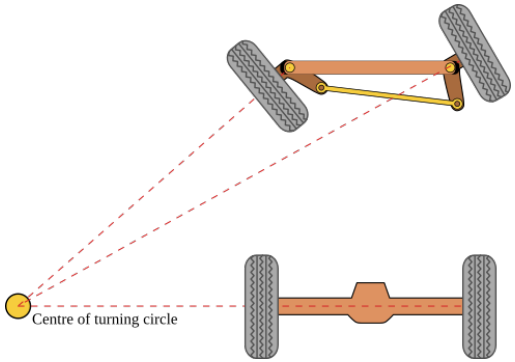



Image: Wikipedia