Module 2 - 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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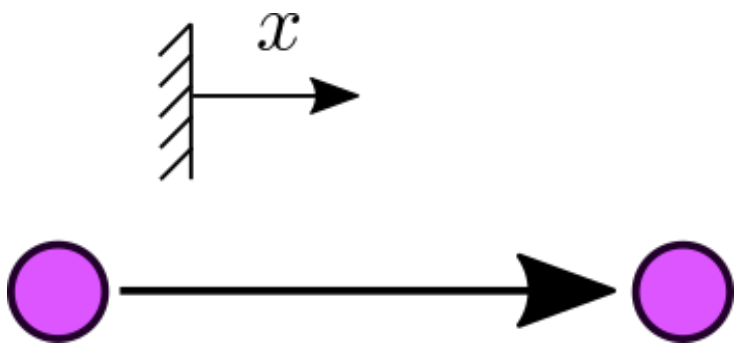
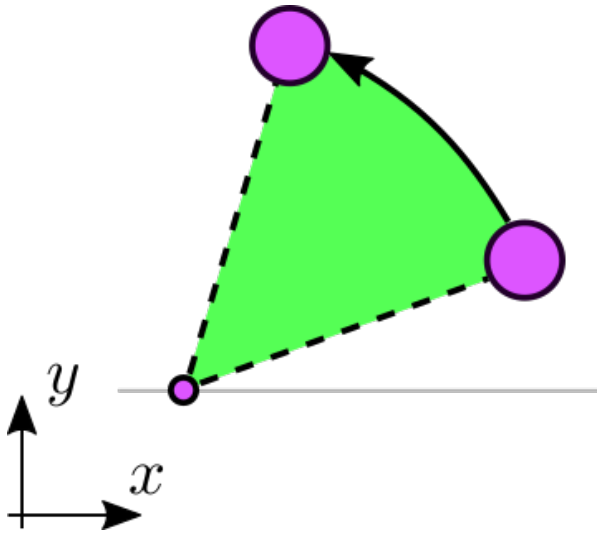


Position	
Velocity	
Acceleration	

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

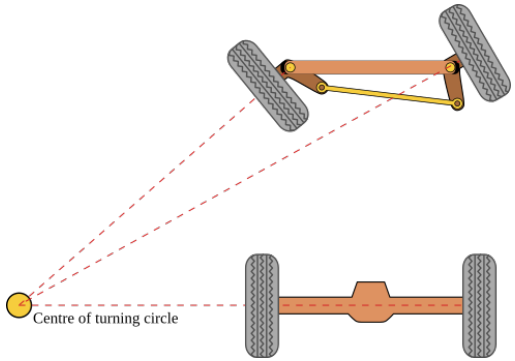


Image: Wikipedia