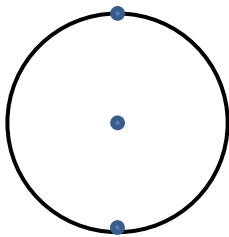


Chassel's Theorem

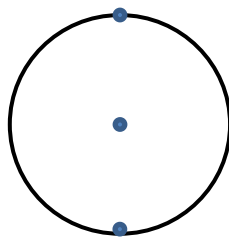
Any general motion no matter how complicated can be broken down into two simpler motion (parts):

- 1) Pure Translation of the Center of Mass
- 2) Pure Rotation About the Center of Mass

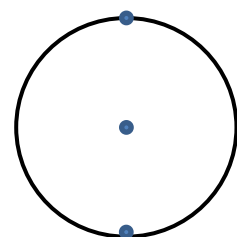
Consider a ball that is rolling without slipping. The ball can be considered to be in pure rotation about the instantaneous point of contact point P.



Pure Translation



Pure Rotation



Total Motion

Chassel's Theorem is very useful in telling us how to find the total kinetic energy of an object. It says that in general we have two kinetic energy sources that we must add together to find the total kinetic energy of an object and not just one like we had for a particle in chapter 6.

$$K_{Total} = K_{Rotation\ about\ CM} + K_{Translation\ CM}$$

Only the center of mass axis will enable us to break down the motion of an object in this manner!!!

Everything else about doing energy problems is just as it was in the Energy Chapter, you just have to count up all the energy.