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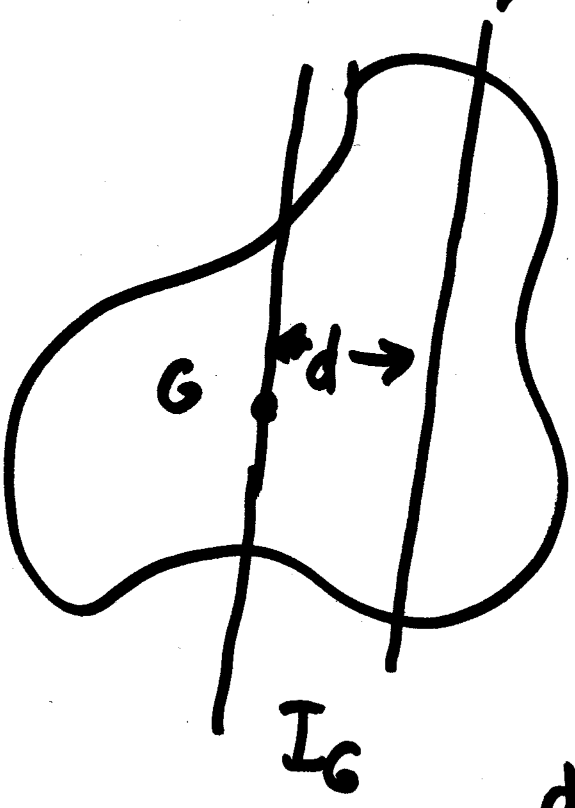
Mon Oct 18 Session 23 Review for Exam II

Wed Oct 20 Section 24 Exam II

University of Idaho **Tricks**

Parallel Axis Theorem



I = moment of inertia about an axis parallel to the one that passes through G $= I_G + md^2$

d = distance between parallel axes

m = total mass of the rigid body.

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Radius of Gyration

$I = k^2 m$ k = Radius of gyration ~ units of length

$k = \sqrt{I/m}$

Tables - Moment of Inertias ~~of~~ for Commonly Occurring (Spelling?) Shapes.

CAD/CAM Software (Solid Modeling)

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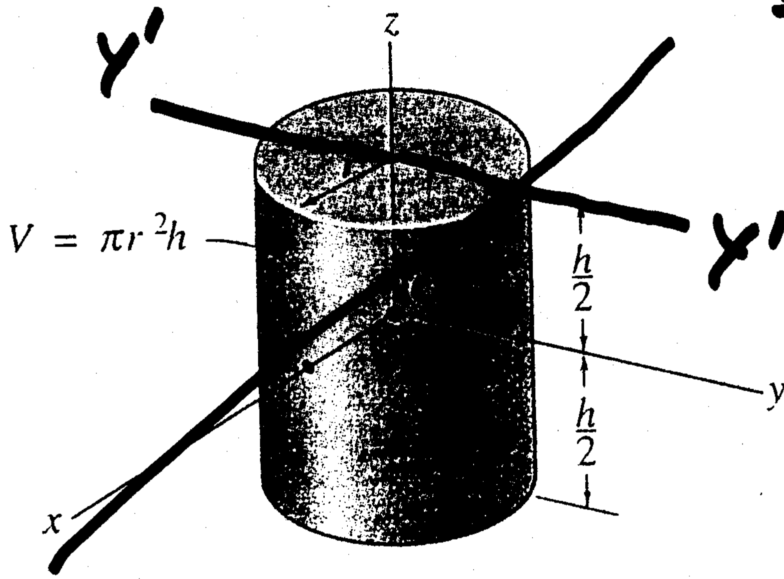
$I_{y'y'} = ?$

$$I_{y'y'} = \underbrace{I_{yy}}_{\text{"}I_o\text{"}} + m\left(\frac{h}{2}\right)^2$$



Cylinder

$I_{xx} = I_{yy} = \frac{1}{12} m(3r^2 + h^2) \quad I_{zz} = \frac{1}{2}mr^2$

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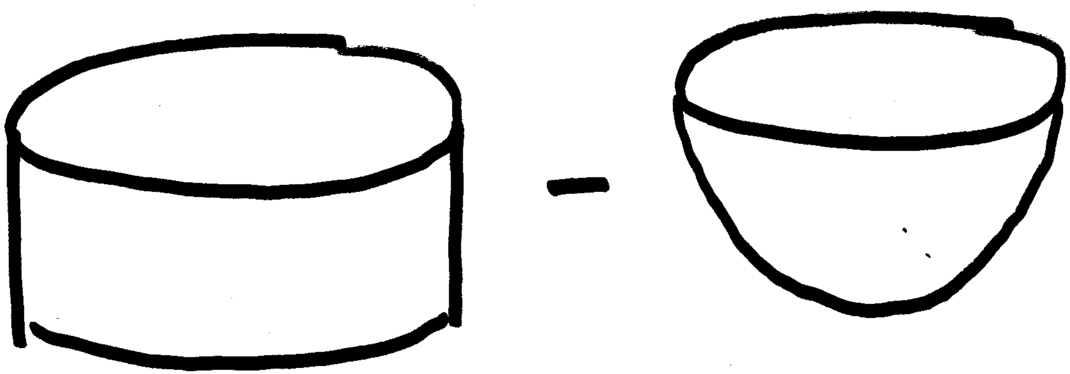
Tricks Cont'd

Addition & Subtraction For ~~[illegible]~~ example problem 17-9 HB.



= Miniature Hot Tub Shape

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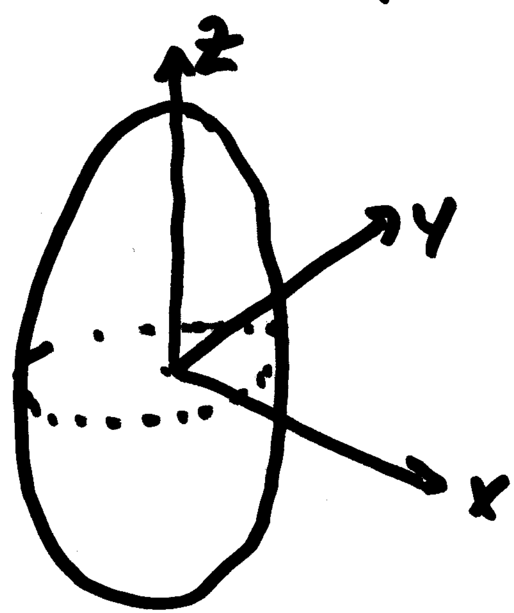
Section 17.2: Planar Kinetics

Equations of Motion

Will consider motion of rigid bodies that are symmetric with respect to the plane of motion



- xy = Plane of Motion (No motion in z-direction)
- Body is symmetric about xy plane
- Body not necessarily symmetric about the z-axis however

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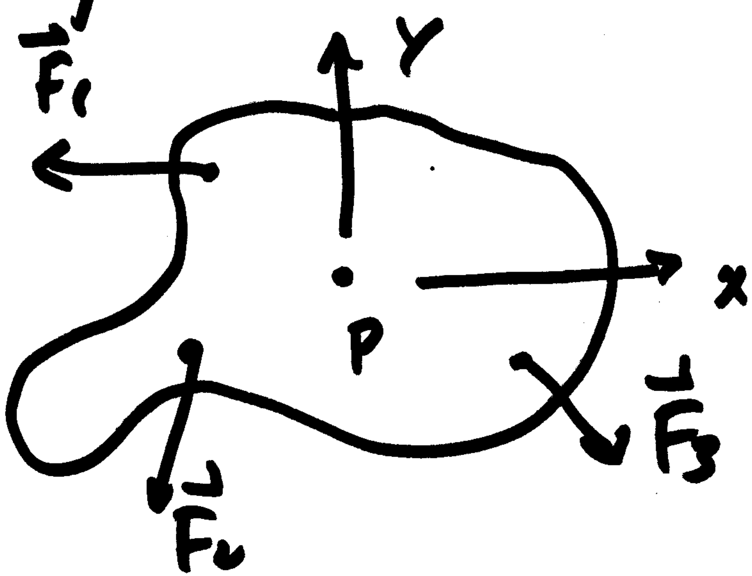
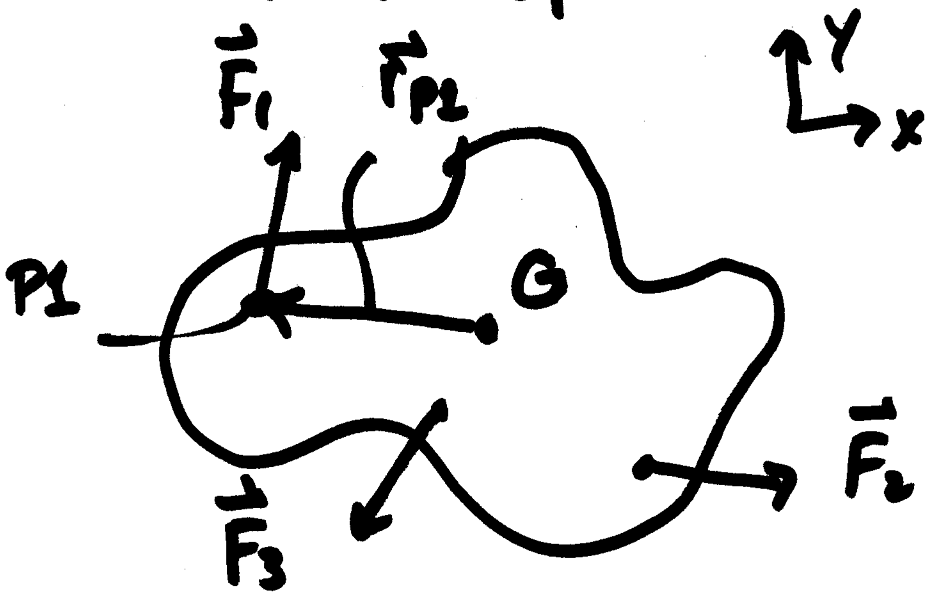
- Applied forces are also in the xy plane

So, we can visualize the rigid body with a top view, i.e., down from the positive z dir, resulting in a diagram like



University of Idaho For a rigid body, we have two choices for the equations of motion:

(1)



$$\sum \vec{M}_G = I_G \vec{\alpha} \quad , \quad \sum \vec{F}_i = m\vec{a}_G$$

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$$\sum \vec{M}_O = \vec{r}_{P1} \times \vec{F}_1 + \vec{r}_{P2} \times \vec{F}_2 + \vec{r}_{P3} \times \vec{F}_3$$