Physics Reference #02

Maximum Static Force of Friction
$\vec{F}_{smax} = \mu_s \vec{F}_N$

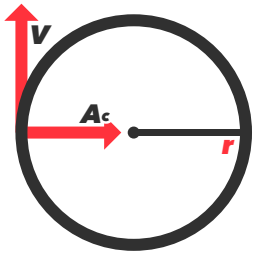
Kinetic Force of Friction
$\vec{F}_k = \mu_k \vec{F}_N$

Static Coefficient of Friction
$\mu_s = \tan\theta_c$

Kinetic Coefficient of Friction
$\mu_k = (a_x - g\sin\theta)/(g\cos\theta)$

Acceleration on a Ramp with Friction
$\vec{A}(t) = -\mu_k g\cos\theta + g\sin\theta$

Circular Motion
$\vec{A}_c(t) = \vec{V}^2/r$



Laminar Drag
$\vec{F}_L = -6\pi\mu_v R\vec{V}$

Viscosity
μ_v

Radius
R

Turbulent Drag
$\vec{F}_T = -\frac{1}{2}\rho C_d A_d |V|\vec{V}$

Rho, Density of Fluid
ρ

Drag Coefficient
C_d

Cross-sectional Area
A_d

Frictionless Ramp Acceleration
$\vec{A} = g\sin\theta$

Flat Curve Max Speed
$\vec{V} = \sqrt{(r\mu_s g)}$

Angled Ramp Speed (Max, Min, Frictionless)
$\vec{V} = \sqrt{(g\, r(\sin\theta + \mu_s\cos\theta)/(\cos\theta - \mu_s\sin\theta))}$

$\vec{V} = \sqrt{(g\, r(\sin\theta - \mu_s\cos\theta)/(\cos\theta + \mu_s\sin\theta))}$

$\vec{V} = \sqrt{(g\, r\tan\theta)}$

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