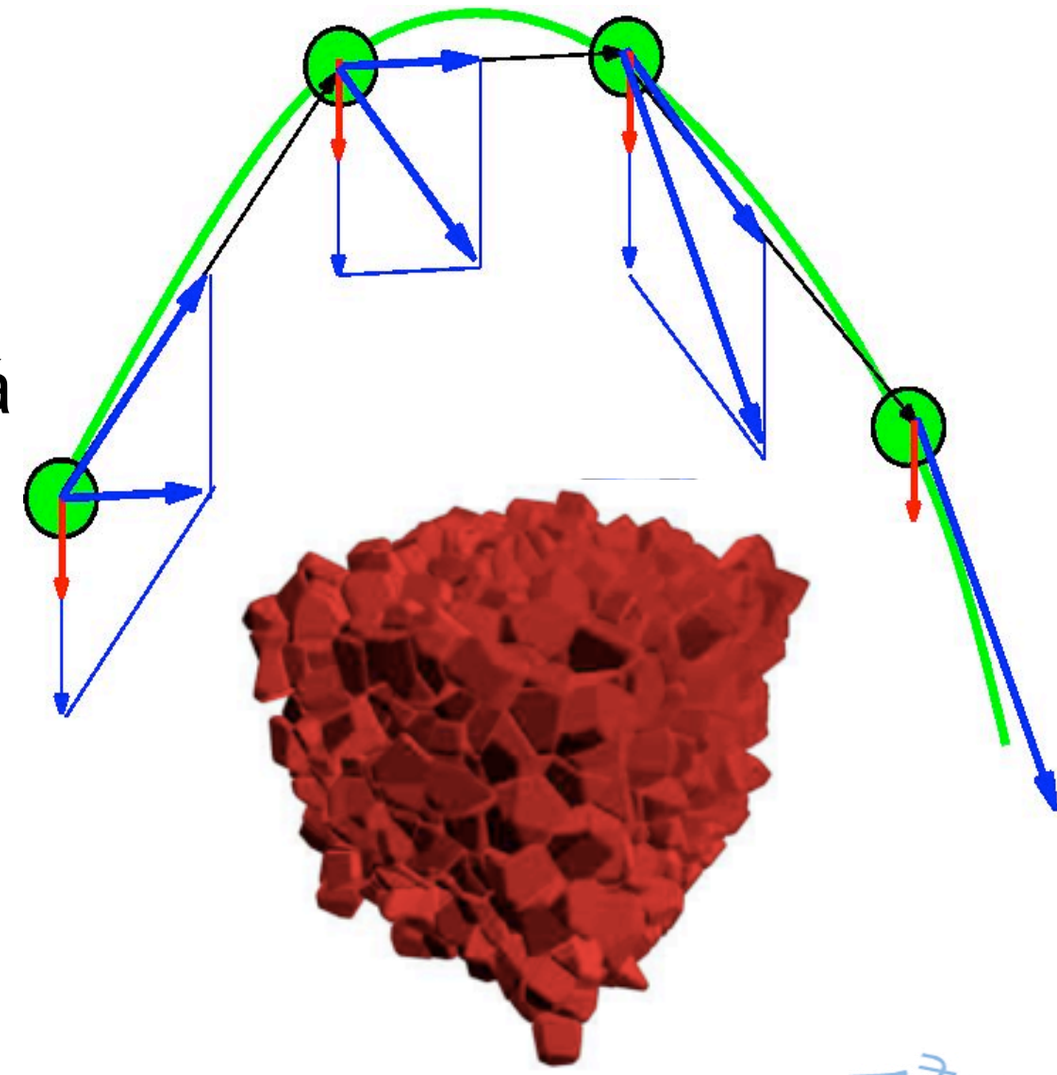
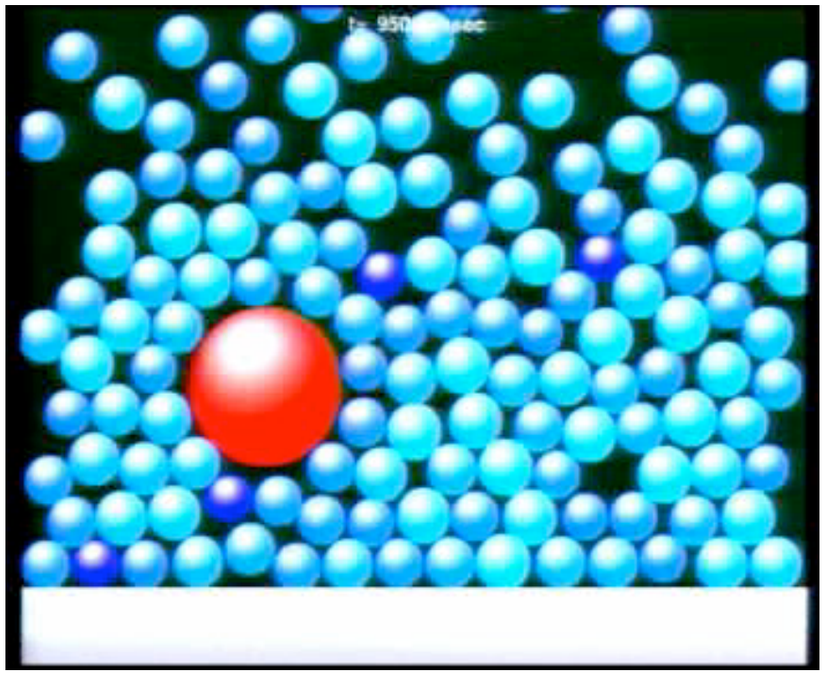
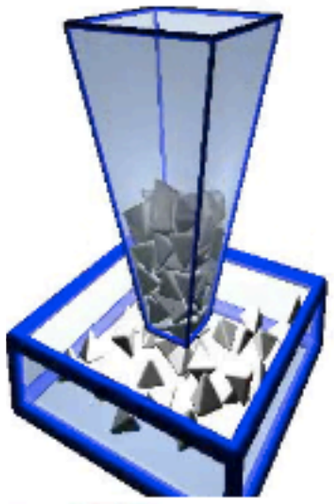
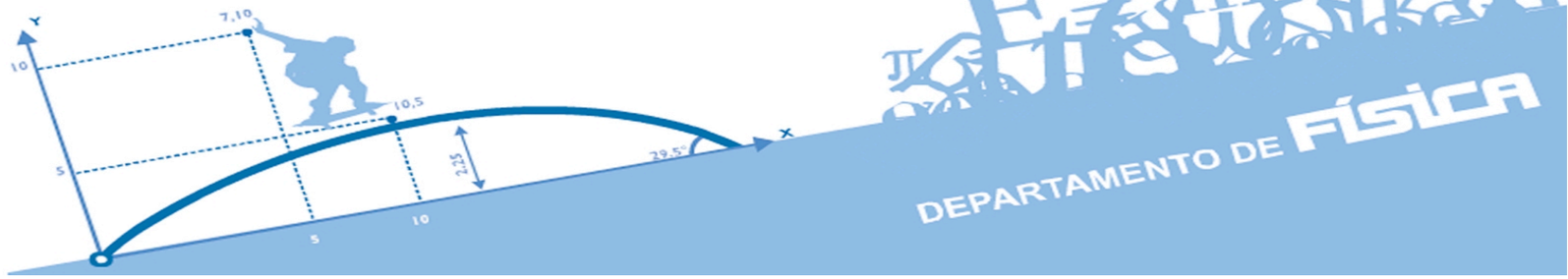
Planetas

Prof. José Daniel Muñoz
Grupo Simulación de Sistemas Físicos
Departamento de Física
Universidad Nacional de Colombia, Bogotá

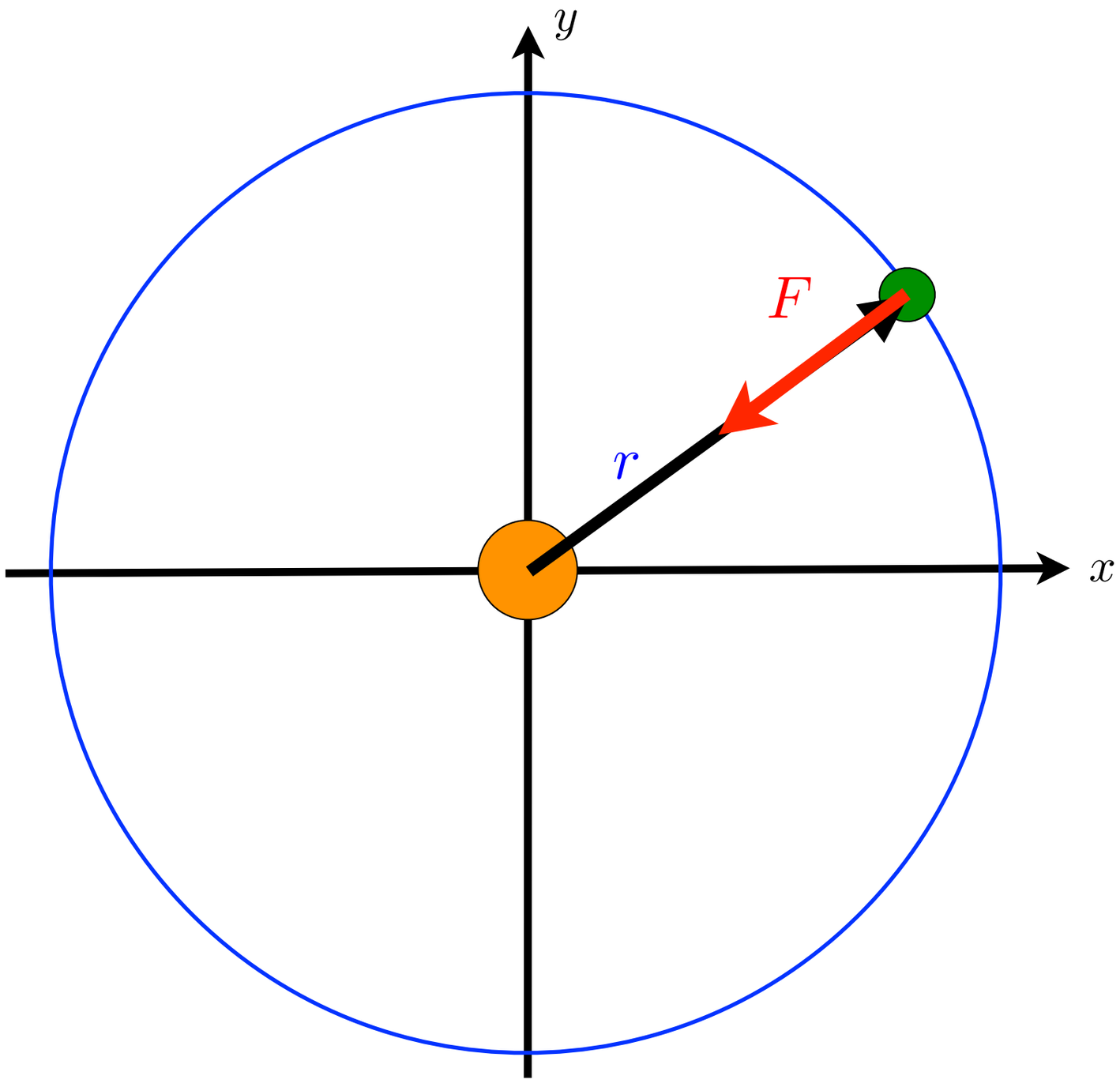








Una fuerza central como $1/r^2$ (Fuerzas)

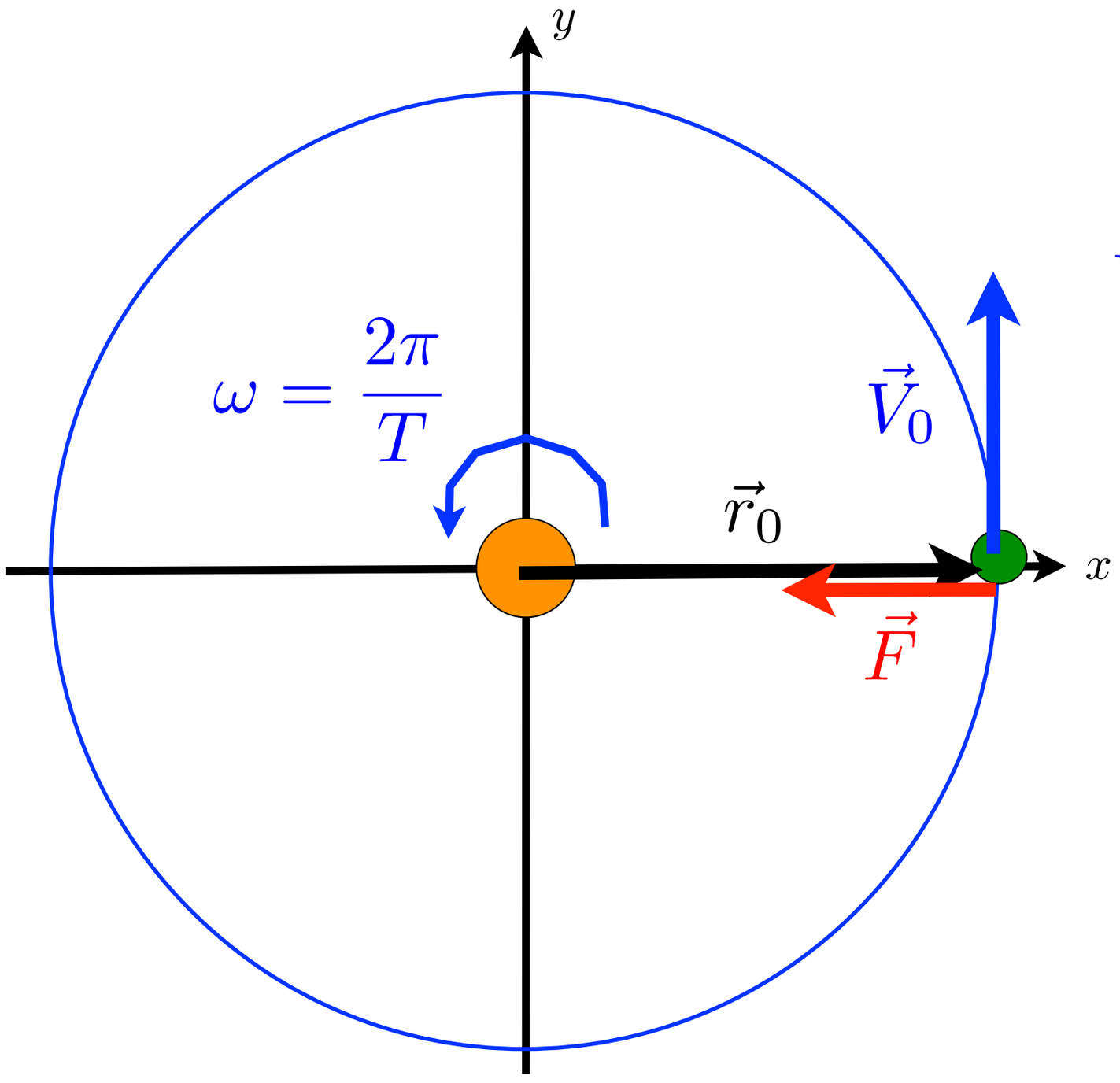


$$F = \frac{GMm}{r^2}$$

$$\vec{F} = -\frac{GMm}{r^3}\vec{r}$$

Una fuerza central como $1/r^2$

(Condición Inicial)



$$\vec{r}_0 = (x_0, y_0) = (r, 0)$$

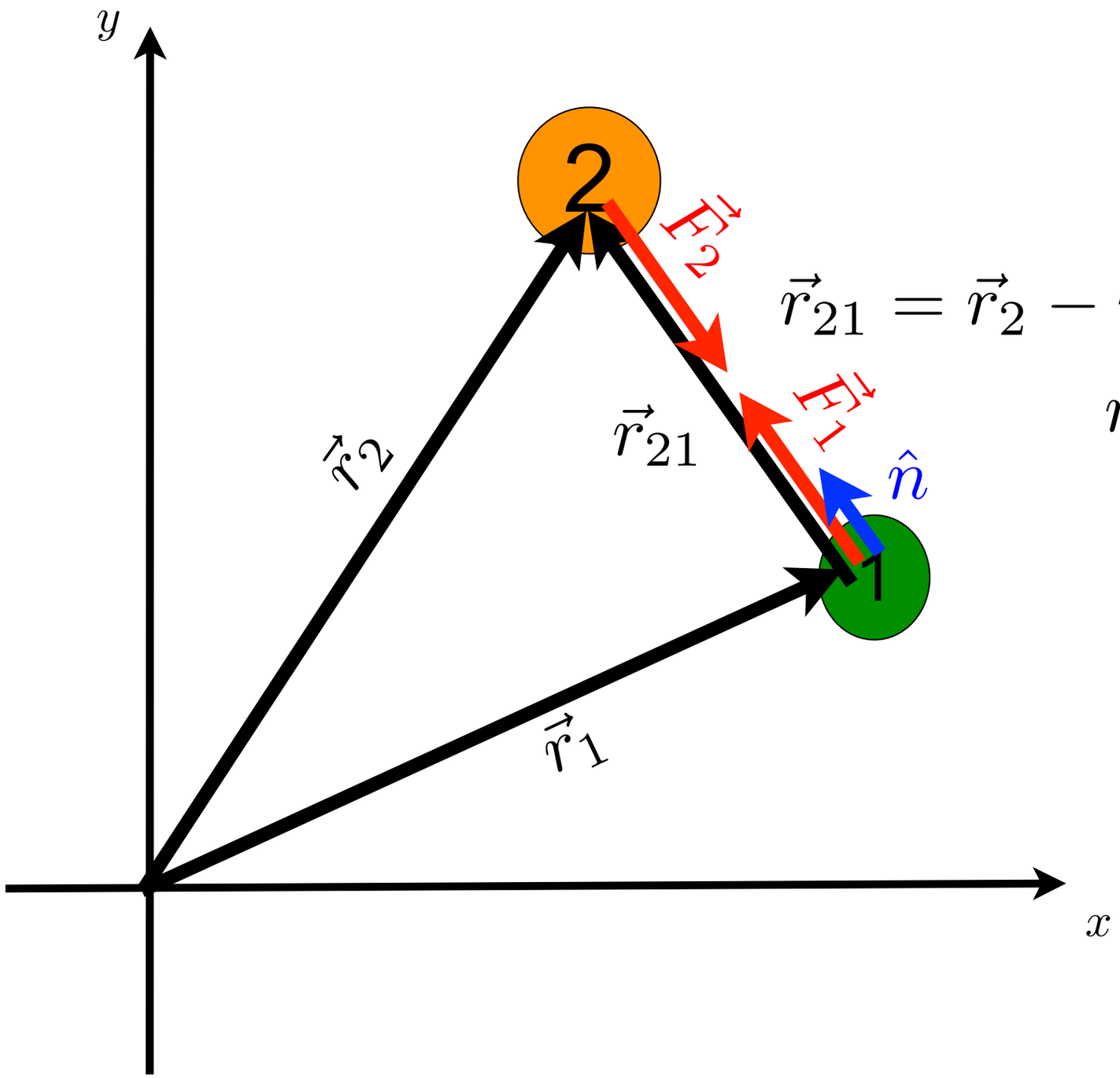
$$\vec{V}_0 = (Vx_0, Vy_0) = (0, V_0)$$

$$\frac{GMm}{r^2} = m\omega^2 r$$

$$\omega = \sqrt{\frac{GM}{r^3}}$$

$$V_0 = \omega r$$

Dos Planetas



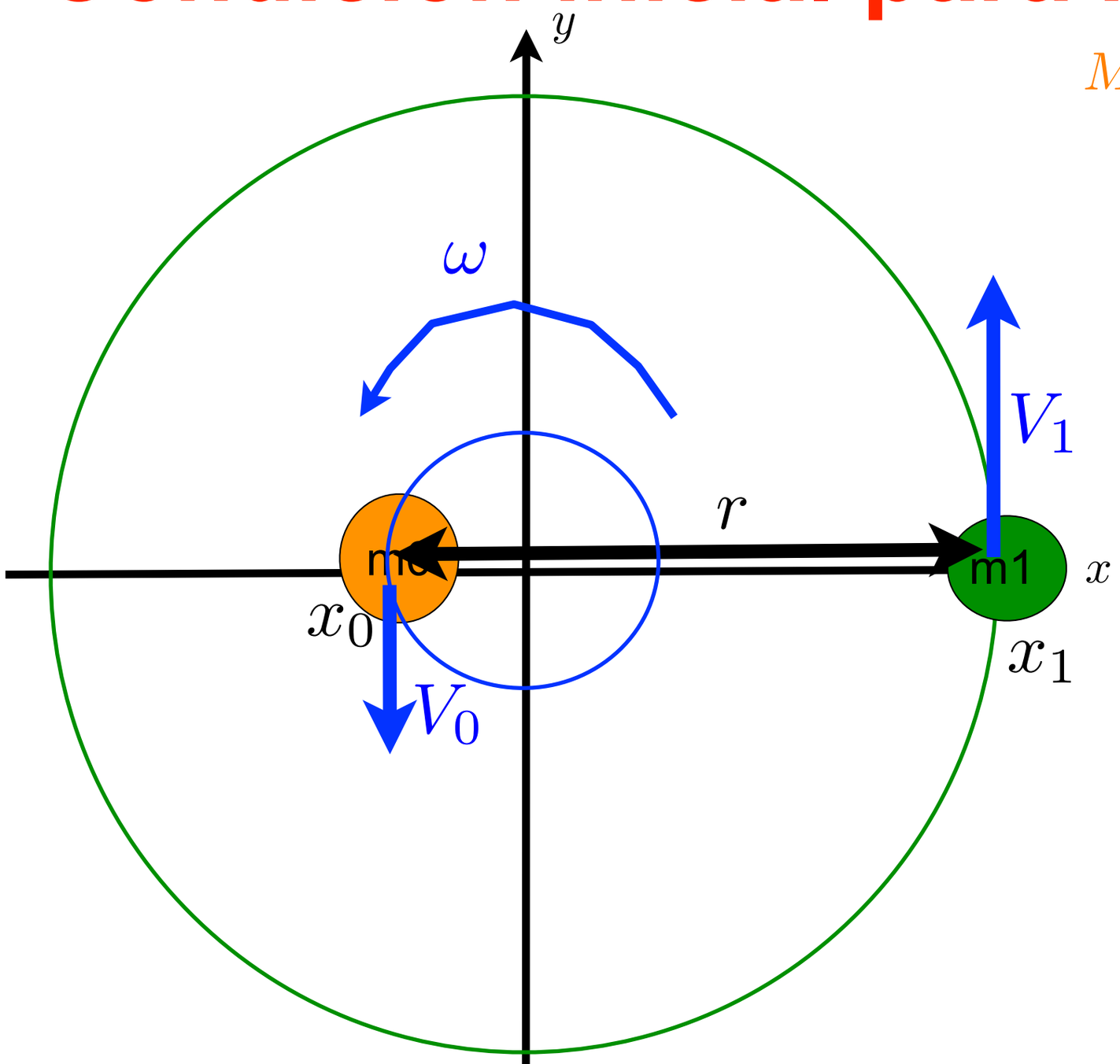
$$F = \frac{GMm}{r^2}$$

$$\vec{r}_{21} = \vec{r}_2 - \vec{r}_1$$

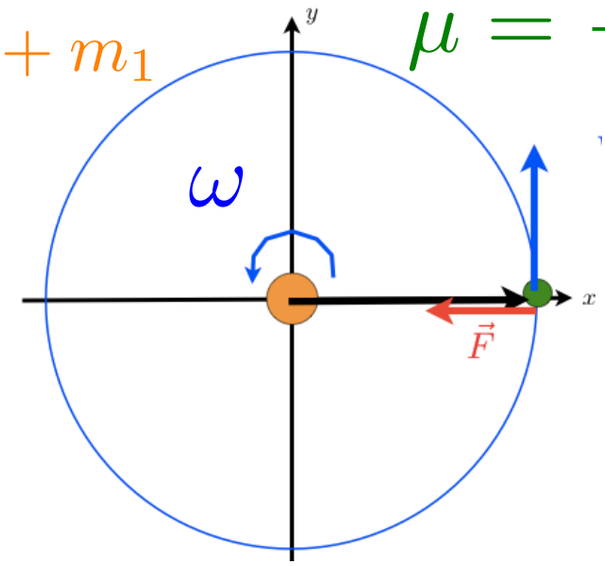
$$r = ||\vec{r}_{21}|| \qquad \hat{n} = \frac{\vec{r}_{21}}{r}$$

$$\vec{F}_1 = F\hat{n} \qquad \vec{F}_2 = -\vec{F}_1$$

Condición inicial para mov circular



$$M = m_0 + m_1 \qquad \mu = \frac{m_0 m_1}{M}$$



$$\frac{GM\cancel{\mu}}{r^2} = \cancel{\mu}\omega^2 r$$

$$\omega = \sqrt{\frac{GM}{r^3}}$$

El centro de masa en el origen

$$m_0 x_0 + m_1 x_1 = 0$$

$$x_1 - x_0 = r$$

$$x_0 = -\frac{m_1 r}{M} \qquad V_0 = \omega x_0$$

$$x_1 = \frac{m_0 r}{M} \qquad V_1 = \omega x_1$$

ssf+un

Gracias!

jdmunozc@unal.edu.co