hasta ahora las fuerzas son:

$$F - \mu m g = M a_1$$

$$\mu m g = m a_2$$

$$F = \alpha t$$

instante

$$t_0 = \frac{\mu g}{\alpha}(M+m)$$

unidad $\alpha = \left[kg \frac{m}{s^3}\right]$

descripción de la aceleración

$t = [0, t_0[$

$$\bar{a}_1 = \bar{a}_2 = \vec{a} = \frac{\alpha t}{(M+m)} \hat{\imath}$$

se considera como un solo cuerpo. de masa $(M+m)$

$t =]t_0, b[\ / \lim_{b \to +\infty}$

$$\vec{a}_1 = \frac{\alpha t}{M} \hat{\imath}$$ la de masa M, va incrementando

$$\vec{a}_2 = 0$$ luego del quiebre de fricción continua a velocidad

$$V = \frac{\alpha t_0}{(M+m)} \cdot t_0 = (M+m)(\mu g)^2 \frac{1}{\alpha}$$

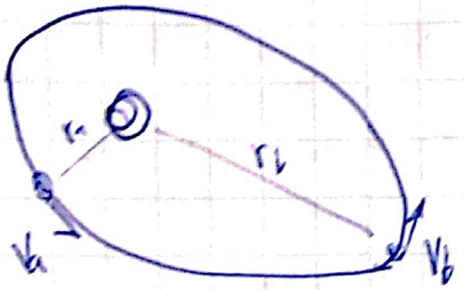
Pero no acelera ya que no hay fuerzas presentes.

Ley de inercia.

Problema gravitación

(1)

$$V(r) = -\left(\frac{GmM}{r}\right)\left(1+\alpha\frac{GM}{c^2 r}\right)$$



encontra que este potencial produce una orbita a precesión.

y encontra la constan α pora los datos.

la energía se conservar $E_a = E_b$

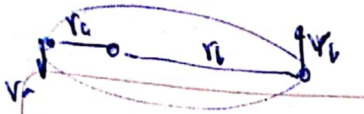
$$\frac{1}{2}\cancel{m}V_a^2 - \left(\frac{G\cancel{m}M}{r_a}\right)\left(1+\alpha\frac{GM}{c^2 r_a}\right) = \frac{1}{2}\cancel{m}V_b^2 - \left(\frac{G\cancel{m}M}{r_b}\right)\left(1+\alpha\frac{GM}{c^2 r_b}\right)$$

$$V_a^2 - V_b^2 = 2GM\left(\frac{1}{r_a}-\frac{1}{r_b}\right) + \cancel{\frac{\alpha GM}{c^2}\left(\frac{1}{r_a}-\frac{1}{r_b}\right)}$$

$$2\alpha\frac{G^2M^2}{c^2 r_a^2} - 2\alpha\frac{G^2M^2}{c^2 r_b^2} = 2\alpha\left(\frac{GM}{c}\right)^2\left(\frac{1}{r_a^2}-\frac{1}{r_b^2}\right)$$

$$V_a^2 - V_b^2 = 2GM\left[\left(\frac{1}{r_a}-\frac{1}{r_b}\right) + \frac{\alpha}{c^2}GM\left(\frac{1}{r_a^2}-\frac{1}{r_b^2}\right)\right]$$

expresión de velocidades



$L = \vec{r} \times \vec{p}$

$$V_a = L/m r_a \qquad V_b = L/m r_b$$ (solo en los ptos de la orbita)

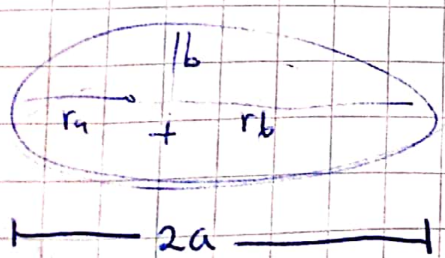
$$\frac{L^2}{m^2}\left(\frac{1}{r_a^2} - \frac{1}{r_b^2}\right) = 2GM\left[\left(\frac{1}{r_a} - \frac{1}{r_b}\right) + \frac{\alpha}{c^2} GM\left(\frac{1}{r_a^2} - \frac{1}{r_b^2}\right)\right]$$

$$\left(\frac{L^2}{m^2} - 2\frac{\alpha}{c^2} G^2M^2\right)\overbrace{\left(\frac{1}{r_a^2} - \frac{1}{r_b^2}\right)}^{\%} = 2GM\left[\overbrace{\left(\frac{1}{r_a} - \frac{1}{r_b}\right)}^{\%_2}\right]$$

$$\%\left(\frac{r_b^2 - r_a^2}{(r_a r_b)^2}\right) \qquad \%_2\left(\frac{r_b - r_a}{r_a r_b}\right)$$

$$\frac{L^2}{m^2} - 2\frac{\alpha}{c^2} G^2M^2 = 2GM\left(\frac{\cancel{r_b - r_a}}{\cancel{r_a r_b}}\right)\left(\frac{(r_a r_b)^2}{(\cancel{r_b - r_a})(r_b + r_a)}\right)$$

$$\frac{L^2}{m^2} = 2GM\left(\frac{r_a \cdot r_b}{r_b + r_a} + GM\frac{\alpha}{c^2}\right)$$



$$\boxed{\frac{L^2}{m^2} = 2GM\left(\frac{b^2}{2a} + GM\frac{\alpha}{c^2}\right)}$$

$r_a \cdot r_b = b^2$

Via 3ra ley de Kepler.

$$T = \frac{\text{area}}{\text{ratio}} \qquad \text{ratio} = \frac{L}{2m} \qquad \text{area elipse} = \pi a b.$$

clasico

$\alpha = 0$

$$\frac{L^2}{m^2} = \cancel{2}GM\left(\frac{b^2}{\cancel{2}a}\right) \quad /\cdot\frac{1}{4} \rightarrow \frac{L^2}{4m^2} = \frac{GMb^2}{4a}$$

$$T^2 = (\pi a b)^2 / \left(L^2/4m^2\right) = \frac{(\pi a b)^2 \; 4a}{GM\, b^2}$$

$$T^2 = \underbrace{\frac{4\pi^2}{GM}}_{\text{constante de Kepler.}} a^3$$

modificado

$$\frac{L^2}{4m^2} = \frac{GM}{2}\left(\frac{b^2}{2a} + GM\frac{\alpha}{c^2}\right)$$

$$T^2 = \frac{\pi^2 a^2 b^2\, 2}{GM}\frac{1}{\left(\frac{b^2}{2a} + GM\frac{\alpha}{c^2}\right)} = \frac{2\pi^2 a^2 b^2}{GM}\frac{2ac^2}{b^2c^2 + 2aGM\alpha}$$

$$T^2 = \frac{4\pi^2}{GM}a^3\frac{b^2c^2}{b^2c^2 + 2aGM\alpha} \Big/ \frac{\frac{1}{(bc)^2}}{\frac{1}{(bc)^2}} = \frac{4\pi^2}{GM}a^3\left(\frac{1}{1 + \frac{2aGM}{(bc)^2}\alpha}\right)$$

Escaneado con CamScanner