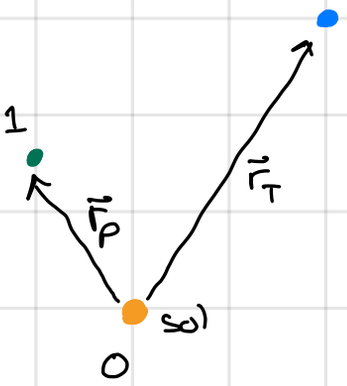
planeta p y Tierra con el sol fijo

$$M_p \ddot{\vec{r}}_p = -\frac{G M_p M_s \hat{\vec{r}}_p}{r_p^2} + \frac{G M_p M_T (\vec{r}_T - \vec{r}_p)}{|\vec{r}_p - \vec{r}_T|^2}$$

$$M_T \ddot{\vec{r}}_T = -\frac{G M_T M_s \hat{\vec{r}}_T}{r_T^2} - \frac{G M_p M_T (\vec{r}_T - \vec{r}_p)}{|\vec{r}_p - \vec{r}_T|^2}$$



$$\ddot{\vec{r}}_p = -\frac{G M_s \hat{\vec{r}}_p}{r_p^2} + \frac{G M_T (\vec{r}_T - \vec{r}_p)}{|\vec{r}_p - \vec{r}_T|^2}$$

$$\ddot{\vec{r}}_T = -\frac{G M_s \hat{\vec{r}}_T}{r_T^2} - \frac{G M_p (\vec{r}_T - \vec{r}_p)}{|\vec{r}_p - \vec{r}_T|^2}$$

$$\frac{1}{GM_s}\ddot{\vec{r}}_p = -\frac{\hat{\vec{r}}_p}{r_p^2} + \frac{\mu_T (\vec{r}_T - \vec{r}_p)}{|\vec{r}_p - \vec{r}_T|^2} \qquad \mu_T = \frac{M_T}{M_s} \; ; \; \mu_p = \frac{M_p}{M_s}$$

$$\frac{1}{GM_s}\ddot{\vec{r}}_T = -\frac{\hat{\vec{r}}_T}{r_T^2} - \frac{\mu_p (\vec{r}_T - \vec{r}_p)}{|\vec{r}_p - \vec{r}_T|^2}$$

$$\frac{1}{GM_s}\ddot{\vec{r}} = \frac{1}{GM_s}\frac{d^2}{dt^2}\vec{r} \qquad \tau = \sqrt{GM_s}\, t$$

$$\frac{d}{dt} = \frac{d\tau}{dt}\frac{d}{d\tau} = \sqrt{GM_s}\frac{d}{d\tau} \qquad \frac{d^2}{dt^2} = GM_s \frac{d^2}{d\tau^2}$$

$$\frac{d^2}{d\tau^2}\vec{r}_p = -\frac{\hat{\vec{r}}_p}{r_p^2} + \frac{\mu_T (\vec{r}_T - \vec{r}_p)}{|\vec{r}_p - \vec{r}_T|^2}$$

$$\frac{d^2}{d\tau^2}\vec{r}_T = -\frac{\hat{\vec{r}}_T}{r_T^2} - \frac{\mu_p (\vec{r}_T - \vec{r}_p)}{|\vec{r}_p - \vec{r}_T|^2}$$

son muy pequeños.