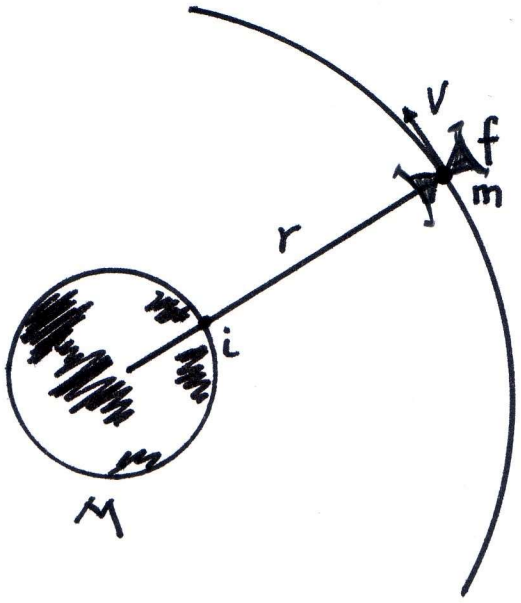

ENERGÍA DE SATÉLITES

$$E_M = E_c + E_p$$

$$E_M = \frac{1}{2} m \cdot v^2 - G \cdot \frac{M \cdot m}{r}$$

$$E_M = \frac{1}{2} m \cdot G \cdot \frac{M}{r} - G \cdot \frac{M \cdot m}{r}$$

$$\boxed{E_M = -\frac{1}{2} G \cdot \frac{M \cdot m}{r}}$$

VELOCIDAD DE LANZAMIENTO (ESCAPE)

$$E_M(i) = E_M(f)$$

$$E_c(i) + E_p(i) = E_c(f) + E_p(f)$$

$$\frac{1}{2} m \cdot v_i^2 - G \frac{M \cdot m}{r_i} = \frac{1}{2} m \cdot v_f^2 - G \frac{M \cdot m}{r_f}$$

$$\downarrow \quad v_f = \sqrt{G \cdot \frac{M}{r_f}}$$

$$\frac{1}{2} m \cdot v_i^2 = \frac{1}{2} G \cdot \frac{M \cdot m}{r_f} - G \cdot \frac{M \cdot m}{r_f} + G \cdot \frac{M \cdot m}{r_i}$$

$$\boxed{v_i = \sqrt{2G \cdot M \cdot \frac{1}{r_i} - \frac{1}{2r_f}}}$$