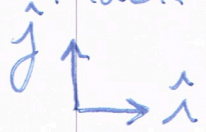
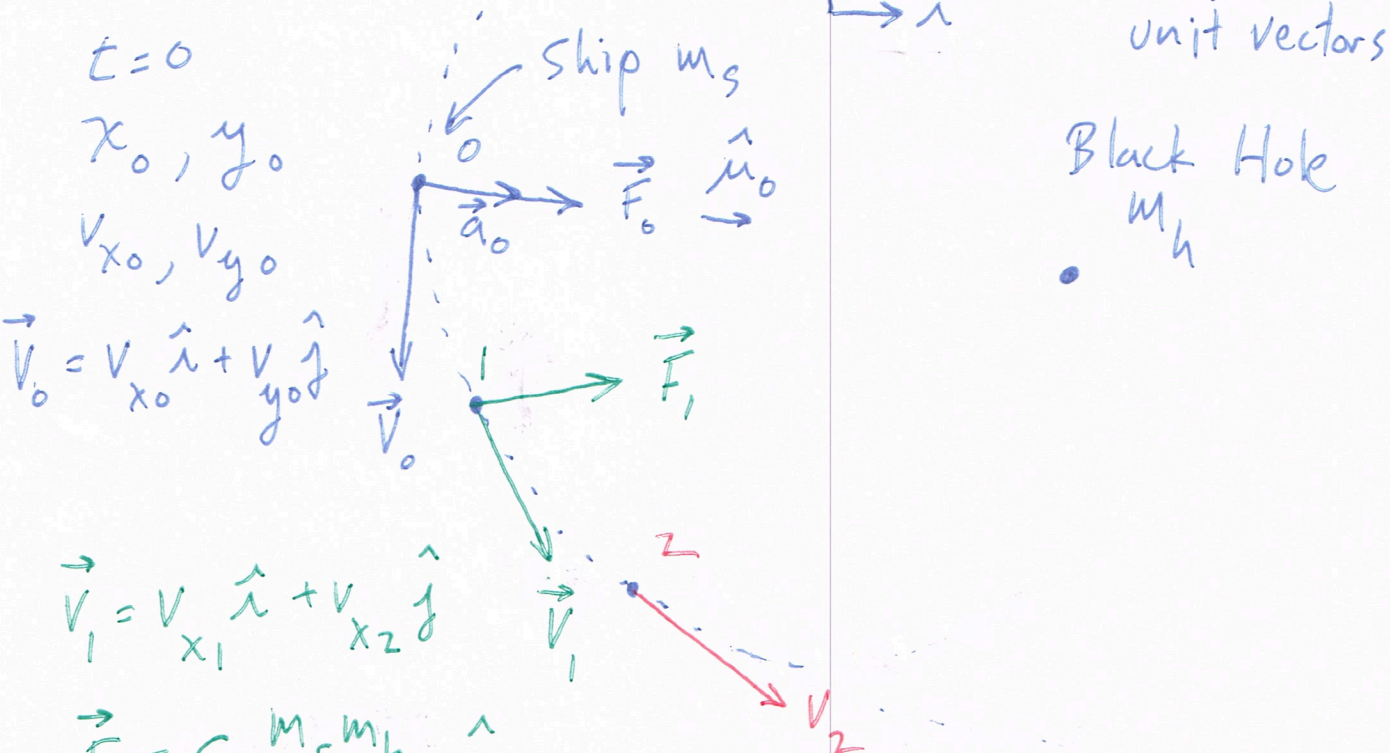
Halverson
6/19/2017

Explanation of "Black Hole Orbit"

$\hat{\imath}, \hat{\jmath}, \hat{u}$ are unit vectors





$$\vec{V}_1 = V_{x_1}\hat{\imath} + V_{x_2}\hat{\jmath}$$

$$\vec{F}_1 = G\frac{m_s m_h}{d^2}\hat{u}_1$$

$$F_{1x} = G\frac{m_s m_h}{d^2}u_{1x} \qquad F_{1y} = G\frac{m_1 m_2}{d^2}u_{1y}$$

$$a_{1x} = \frac{F_{1x}}{m_s} = \frac{Gm_h}{d^2}u_{1x} \qquad a_{1y} = \frac{F_{1y}}{m_s} = \frac{Gm_h}{d^2}u_{1y}$$

$$\vec{V}_1 = \vec{V}_0 + \vec{a}_1\Delta t$$

$$V_{1x} = V_{0x} + a_{1x}\Delta t \qquad V_{1y} = V_{0y} + a_{1y}\Delta t$$

Location at $t=1$ $\quad \vec{d}_1 = d_0$