

# 358(7): Tabular Summary of Theory

Quantity	Cotes Spiral Orbit	Whirlpool Galaxy
SpaceTime Velocity field $\underline{V}_F$	$\frac{LFZ}{m_r r_F^3} (-Y_i + X_j)$	$\frac{LFZ}{m_r r_F^3} (-Y_i + X_j)$
SpaceTime Angular Momentum	$m_r \underline{r}_F \times \underline{V}_F$	$m_r \underline{r}_F \times \underline{V}_F$
Force between $m$ and $M$ , $\underline{F} = m \underline{g}$ , $m_r = \frac{mM}{m+M}$ = reduced mass	$m_r (\underline{V}_F \cdot \underline{\nabla}) \underline{V}_F$ $= -\frac{LFZ}{m_r r_F^3} \underline{e}_r$ (attractive, $m$ is attracted to $M$ , $m_r = mM/(m+M)$ )	$-m_r (\underline{V}_F \cdot \underline{\nabla}) \underline{V}_F$ $= \frac{LFZ}{m_r r_F^3} \underline{e}_r$ (repulsive, $m$ is repelled away from $M$ )
Divergenceless $\underline{V}_F$	$\underline{\nabla} \cdot \underline{V}_F = 0$	$\underline{\nabla} \cdot \underline{V}_F = 0$
Wavez Cavity of SpaceTime	$\frac{\partial \Phi_F}{\partial t} + a_0^2 \underline{\nabla} \cdot \underline{V}_F = 0$	$\frac{\partial \Phi_F}{\partial t} + a_0^2 \underline{\nabla} \cdot \underline{V}_F = 0$
Source Mass Density $\rho_m$ (matter)	$\rho_m = \frac{q_F}{4\pi G} = \frac{1}{4\pi G} \left( \frac{LFZ}{m_r r_F^2} \right)^2$	$\rho_m = \frac{q_F}{4\pi G} = \frac{1}{4\pi G} \left( \frac{LFZ}{m_r r_F^2} \right)^2$
Orbit	$\theta = r_0 / r$ (hyperbolic spiral)	$\theta = -r_0 / r$ (mirror image spiral)
Orbital linear velocity of $m$	$v^2 = \frac{LFZ^2}{m_r^2} \left( \frac{1}{r^2} + \frac{1}{r_0^2} \right)$ $\xrightarrow{r \rightarrow \infty} \left( \frac{LFZ}{m_r r_0^2} \right)^2 = \text{constant}$	$v^2 = \frac{LFZ^2}{m_r^2} \left( \frac{1}{r^2} + \frac{1}{r_0^2} \right)$ $\xrightarrow{r \rightarrow \infty} \left( \frac{LFZ}{m_r r_0^2} \right)^2 = \text{constant}$
SpaceTime Current	$\underline{J}_F = \frac{4a_0^2}{r_F^2} \underline{V}_F$ $r_F^2 = X^2 + Y^2$	$\underline{J}_F = \frac{4a_0^2}{r_F^2} \underline{V}_F$ $r_F^2 = X^2 + Y^2$