Dynamics in (r, φ, Υ) in (i, j, k)

- solution for the relative motion: $r = r\cos\varphi\, i + r\sin\varphi\, j$

- the basic vectors: $\begin{pmatrix} i \\ j \\ k \end{pmatrix} = \mathcal{R}(i, \Theta)\, \mathcal{R}(e_Z, \Upsilon) \begin{pmatrix} e_X \\ e_Y \\ e_Z \end{pmatrix}$

- the quasi–Keplerian representation:

$$r = a_r\left(1 - e_r\cos u\right), \qquad n(t - t_0) = u - e_t\sin u,$$

$$\varphi - \varphi_0 = (1 + k)v,$$

$$\Upsilon - \Upsilon_0 = \frac{\chi_{\mathrm{so}} J}{c^2 L^3}\left(v + e\sin v\right),$$

$$v = 2\arctan\left[\left(\frac{1 + e_\varphi}{1 - e_\varphi}\right)^{1/2}\tan\frac{u}{2}\right]$$