Next study departures from orgin in other directions: Let $t^\circ = 0$. Then we have

36 cont

$$z = b + v_0 t + A\cos(\omega t + \delta)$$

$$x = c - A\sin(\omega t + \delta)$$

$$y = y^\circ + v_y^\circ t$$

To get departures from origin at $t=0$, need to adjust b, c, & y° to give

$$z = -A\cos\delta + v_0 t + A\cos(\omega t + \delta)$$

$$x = A\sin\delta - A\sin(\omega t + \delta)$$

$$y = v_y^\circ t$$

Then

$$\left.\begin{aligned} \dot{z}(0) = v_z^\circ &= v_0 - A\omega\sin\delta \\ \dot{x}(0) = v_x^\circ &= -\omega A\cos\delta \\ \dot{y}(0) = v_y^\circ &= v_y^\circ \end{aligned}\right\}$$ these determine A and δ.

Let t_ℓ be the time of arrival at ℓ. Then

$$\ell = -A\cos\delta + v_0 t_\ell + A\cos(\omega t_\ell + \delta)$$

or $$t_\ell = \frac{\ell}{v_0} + \frac{1}{v_0} A\cos\delta - \frac{A}{v_0}\cos(\omega t_\ell + \delta)$$