Now put (A12) into (A10) to get

\[ \dot{\psi} + 2 (\omega/R) \left[ \frac{2 R \alpha}{\omega} + \beta \cos(\omega t + \chi) \right] = \alpha, \quad \text{or} \]

\[ \dot{\psi} = -3 \alpha - \frac{2 \omega \beta}{R} \cos(\omega t + \chi). \tag{A13} \]

Integrating (A13) gives

\[ \psi = -3 \alpha t - \frac{2 \beta}{R} \sin(\omega t + \chi) + \delta \tag{A14} \]

where \( \delta \) is an integration constant.

Suppose the lens cap is thrown out in the direction of the orbit at \( t = 0 \).

Then at \( t = 0 \) we have

\[ \psi = 0, \quad \dot{\psi} = \text{const} > 0 \]

\[ \rho = 0, \quad \dot{\rho} = 0. \]