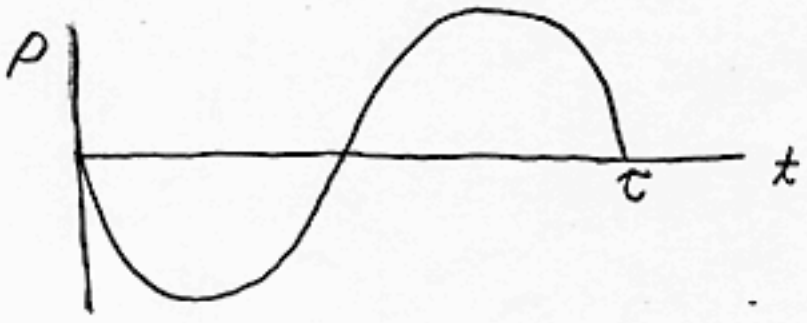
Finally, $\rho(\tau)$ has the graph



That is $\rho > 0$ and $\dot{\rho} < 0$ when t is slightly before τ. Therefore, the cosmonaut sees the lens cap coming toward him when he is facing away from the earth.

f) Now consider general initial conditions:

Integrating (A6) gives

$$\dot{\psi} + 2(\omega/R)\rho = \text{const} = \alpha. \qquad (A10)$$

Putting this in (A5) gives

$$\ddot{\rho} = 3\omega^2\rho + 2\omega R\left[-2(\omega/R)\rho + \alpha\right], \text{ or}$$

$$\ddot{\rho} = -\omega^2\rho + 2\omega R\alpha. \qquad (A11)$$

This equation has the solution

$$\boxed{\rho = \frac{2R\alpha}{\omega} + \beta\cos(\omega t + \gamma)} \qquad (A12)$$