Problem 1.c

We set k = 1, m=1, and thus the low velocity limit angular frequency is , $\omega_0 = \sqrt{k/m} = 1.$

Now we set three cases of initial velocities to be $\frac{v_0}{c} = 0.2, 0.3, 0.4.$

We found that the effective angular velocities are equal to

$$\omega' = \omega_0(1 - \frac{1}{4}\left(\frac{\bar{v}}{c}\right)^2),$$

And that the time averaged velocity $\bar{v} = 0.5v_0$