$$x(t) = R_0(1/\gamma^2 + (2/\gamma)\cos(.5\gamma ct / R_o))\cos(\gamma ct / R_o)$$

$$y(t) = \pm R_0(1/\gamma^2 + (2/\gamma)\cos(.5\gamma ct / R_o))\sin(\gamma ct / R_o)$$

$$z(t) = (2R_0/\gamma)\sin(.5\gamma ct / R_o) + vt$$