

$$x(i) = \frac{2z_0^{(2)}}{\sin^2 i_0} \int_{i_0}^i \sin^2 \chi d\chi = \frac{z_0^{(2)}}{2\sin^2 i_0} (2i - 2i_0 - \sin 2i - \sin 2i_0) ,$$

$$z(i) = z_0^{(2)} \left(\left(\frac{\sin i}{\sin i_0} \right)^2 - 1 \right) = \frac{z_0^{(2)}}{2\sin^2 i_0} (1 - \cos 2i - \cos 2i_0) ,$$

$$t(i) = \frac{2z_0^{(2)}}{v_0 \sin i_0} \int_{i_0}^i \chi d\chi = \frac{i - i_0}{\sin i_0} \tau_0 .$$

These are the equation of a right cycloid generated by a circle with

$$R = \frac{1}{2} \frac{z_0}{\sin^2 i_0} = \frac{1}{2} \frac{z}{\sin^2 i}$$