The equation for horizontal motion in x-directoin is given by:

$$x(t) = \beta_{x,1} e^{\alpha t} + \beta_{x,2} e^{-\alpha t} + p_x(t) \tag{1}$$

where

$$\begin{aligned}
\beta_{x,1} &= \frac{(x_0 - p_{0,x})}{2} + \frac{\dot{x}_0 T - (p_{T,x} - p_{0,x})}{2\alpha T}, \\
\beta_{x,2} &= \frac{(x_0 - p_{0,x})}{2} - \frac{\dot{x}_0 T - (p_{T,x} - p_{0,x})}{2\alpha T}, \\
\alpha &= \sqrt{\frac{g}{h}}.
\end{aligned}$$