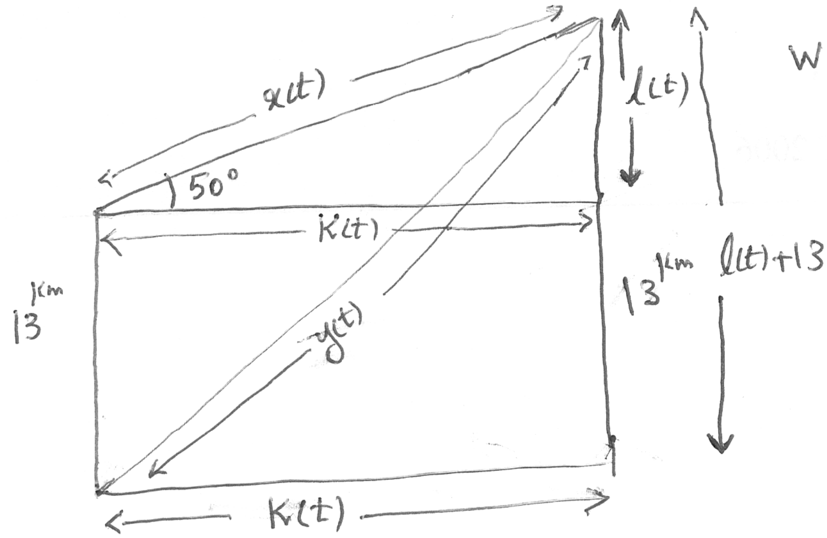
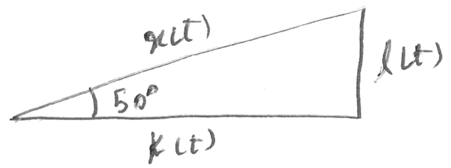
Method II -

Here, we should similarly note that $x(t) = 14t$, so this part is the same as the first method, but the geometrical approach is different.

We introduce $K(t)$ and $l(t)$.



In

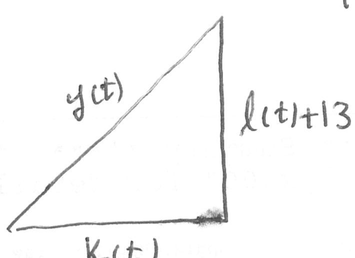


, we have $\begin{cases} l(t) = x(t) \sin 50^\circ \\ K(t) = x(t) \cos 50^\circ \end{cases}$ (I)

$\xrightarrow{\frac{d}{dt} \text{ of (I)}} \begin{cases} \frac{dl}{dt} = \frac{dx}{dt} \sin 50 \\ \frac{dK}{dt} = \frac{dx}{dt} \cos 50 \end{cases}$ (II). At $t=2$, (I) becomes $\begin{cases} l(2) = 28 \sin 50 \\ K(2) = 28 \cos 50 \end{cases}$

and (II) becomes $\begin{cases} \left.\frac{dl}{dt}\right|_2 = 14 \sin 50 \\ \left.\frac{dK}{dt}\right|_2 = 14 \cos 50 \end{cases}$.

In



, we have $y^2(t) = K^2(t) + (l(t)+13)^2$

$\xrightarrow[\text{and simplify}]{\frac{d}{dt}} y \frac{dy}{dt} = K \frac{dK}{dt} + (l+13) \frac{dl}{dt}$

$\xrightarrow[\text{using the above information}]{\text{at } t=2} \begin{cases} y^2(2) = K^2(2) + (l(2)+13)^2 \longrightarrow y(2) \simeq 38.87 \\ y(2) \left.\frac{dy}{dt}\right|_2 = K(2) \left.\frac{dK}{dt}\right|_2 + (l(2)+13) \left.\frac{dl}{dt}\right|_2 \end{cases}$

$\longrightarrow \left.\frac{dy}{dt}\right|_2 \simeq 13.67$