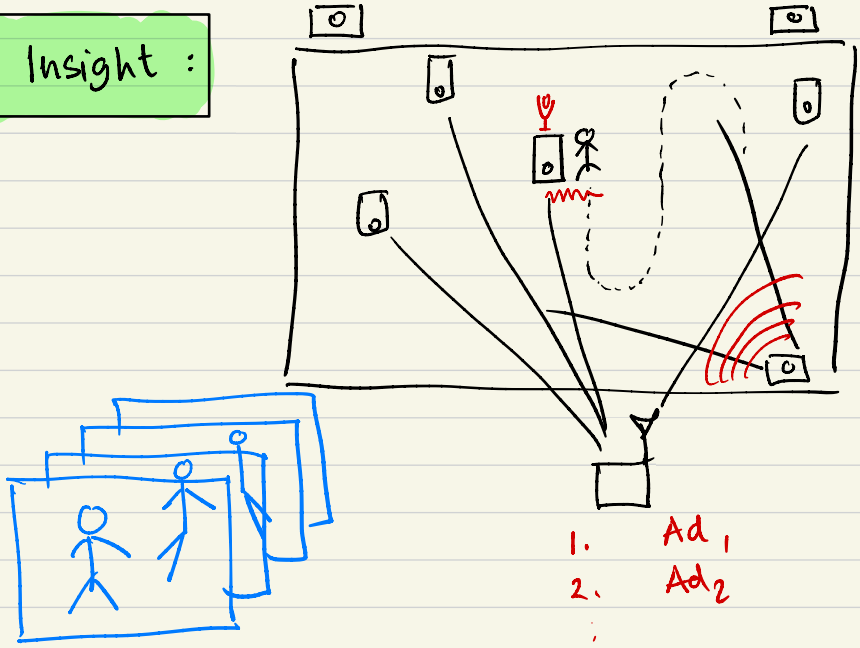
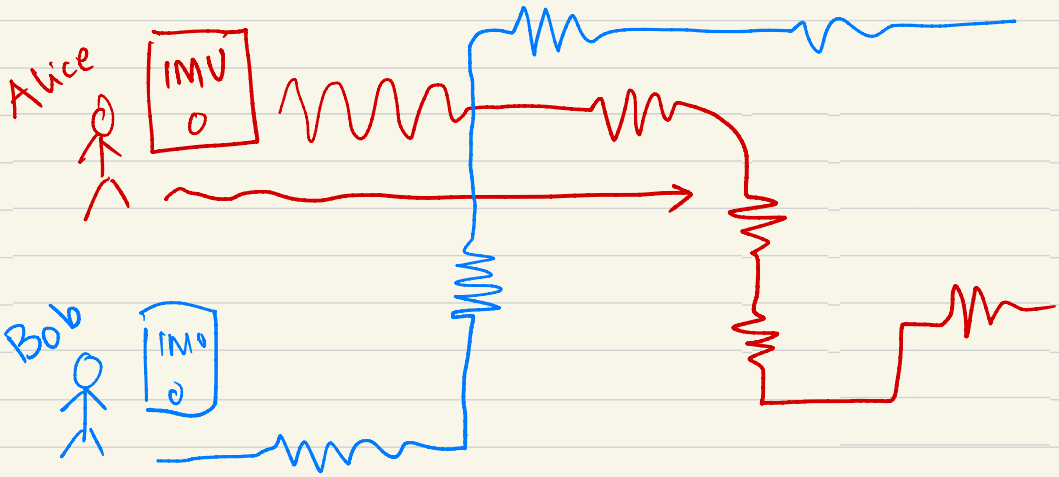
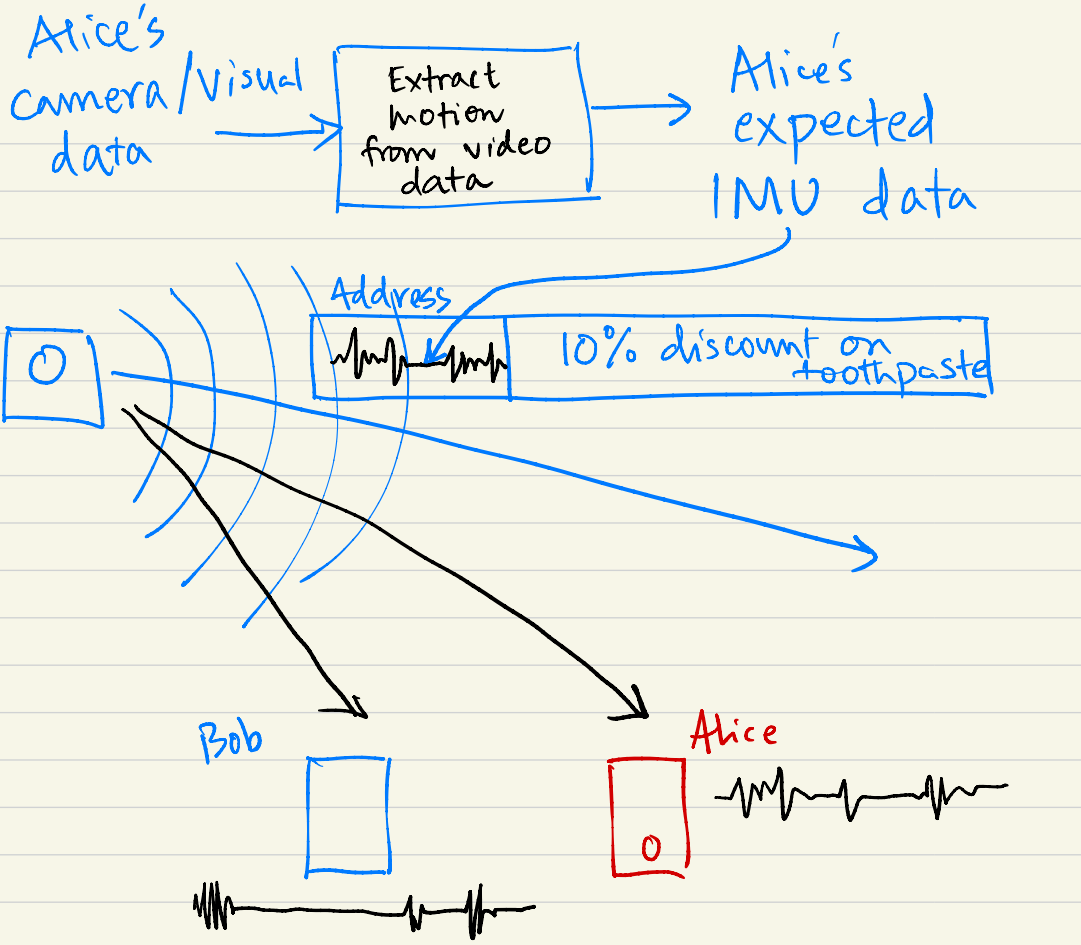
Assorted Ideas & Applications

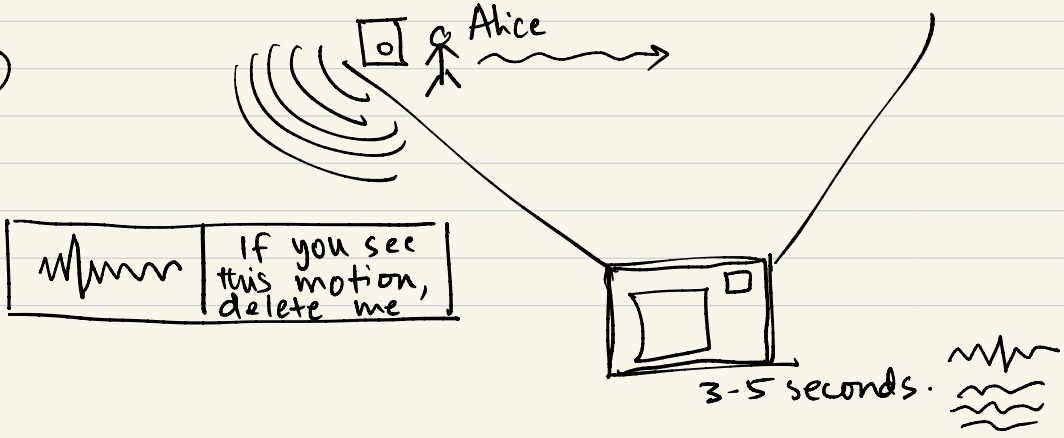
① Insight :

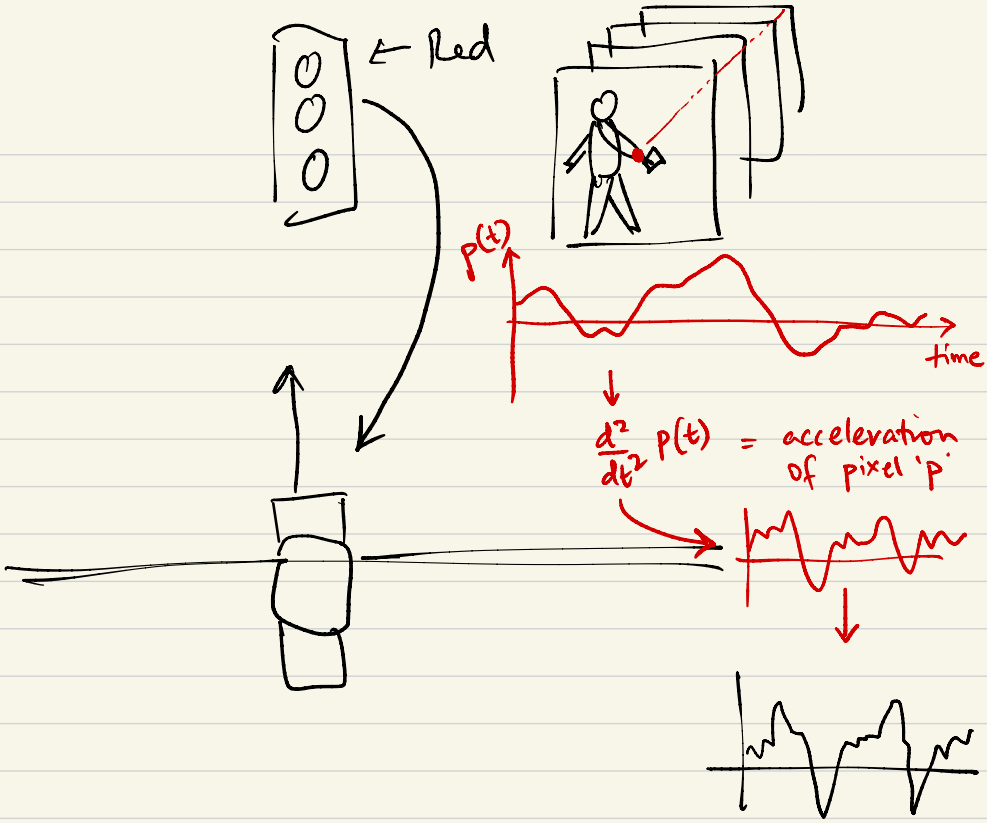


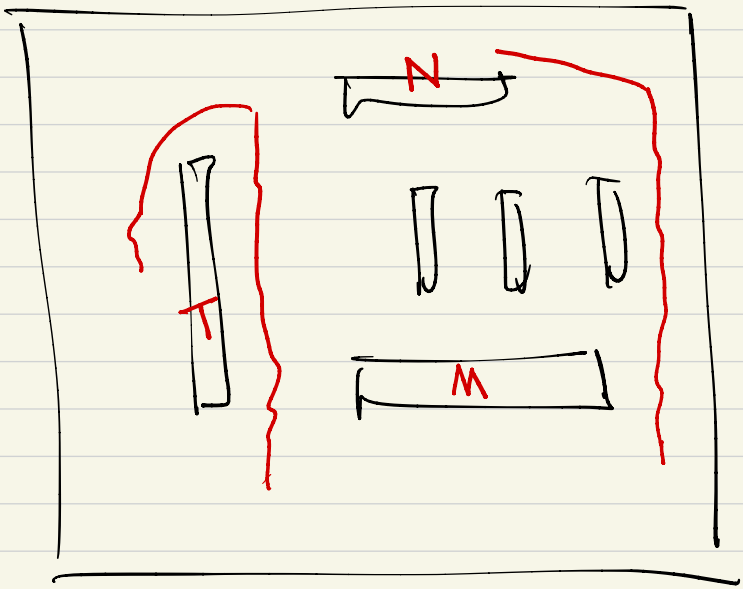




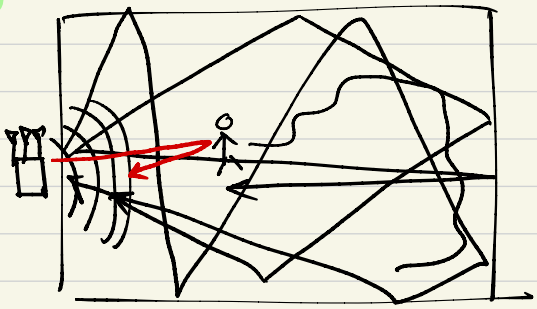
- created a temporary identifier for a user that can be used for communication.




← Red
p(t)
time
$\frac{d^2}{dt^2} p(t)$ = acceleration of pixel 'p'

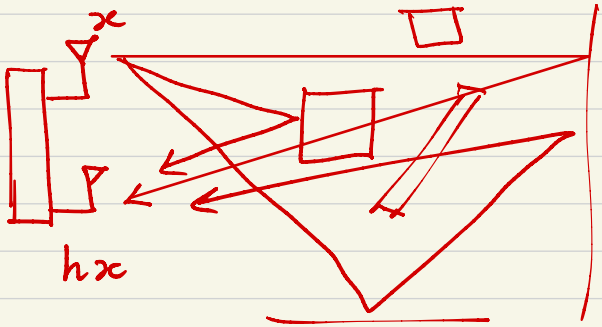

N
T
M

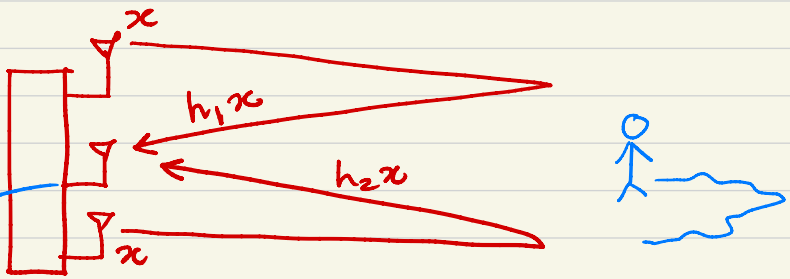
② WiTrack



background

Cancel out all reflections and only get reflections from the moving human.





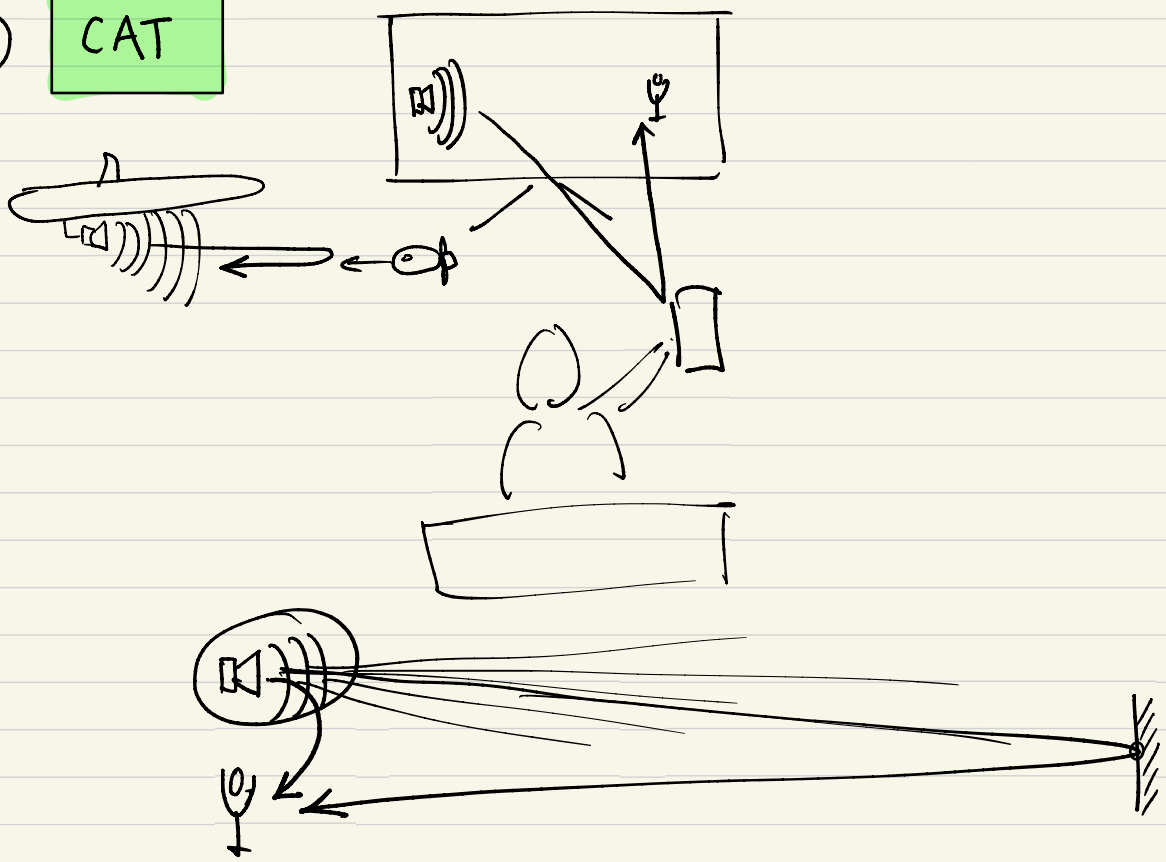
instead of x, I send $x' = -h_1 h_2^{-1} x$

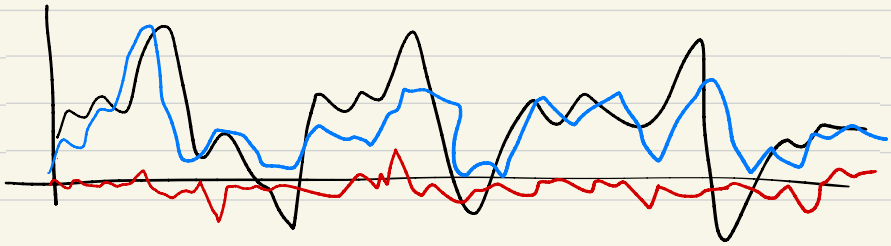
Receives $= h_1 x + h_2(-h_1 h_2^{-1})x$

$= 0$

When user moves, received signal ≠ 0

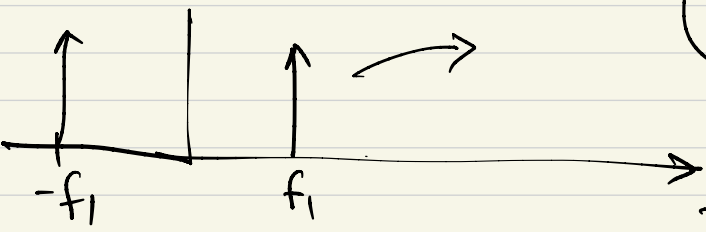
③ CAT





Red + Blue = Black signal.

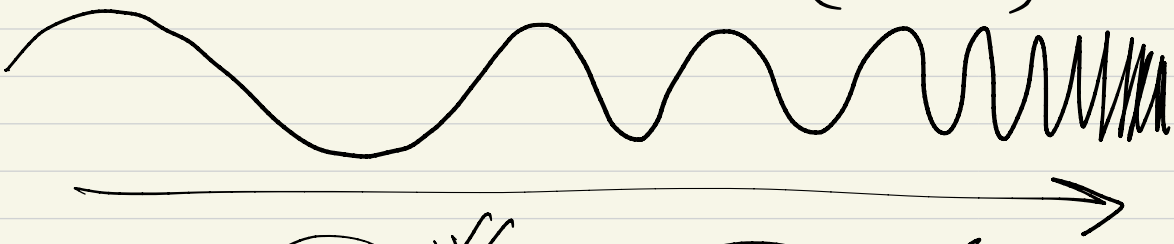
FMCW ⇒ Freq. modulated continuous wave.



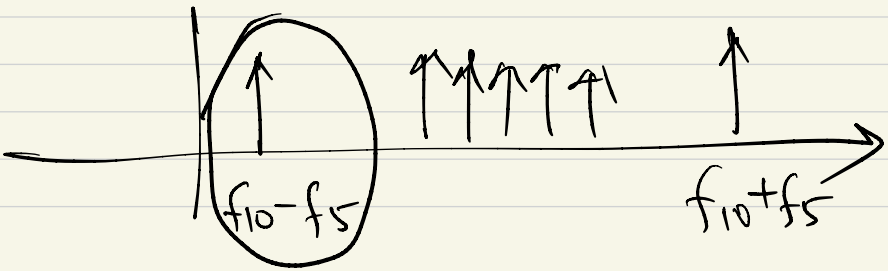
$(\sin f_{10})(\sin f_5)$

$(f_{10} + f_5)$

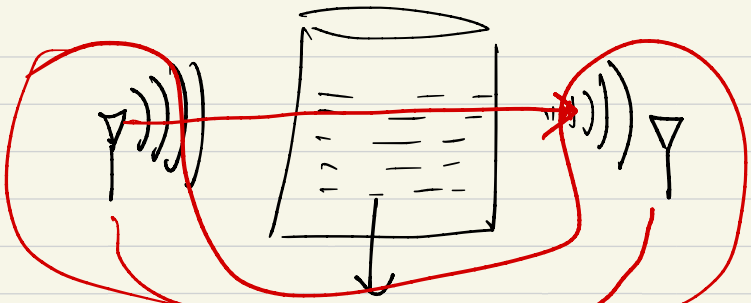
freq $(f_{10} - f_5)$



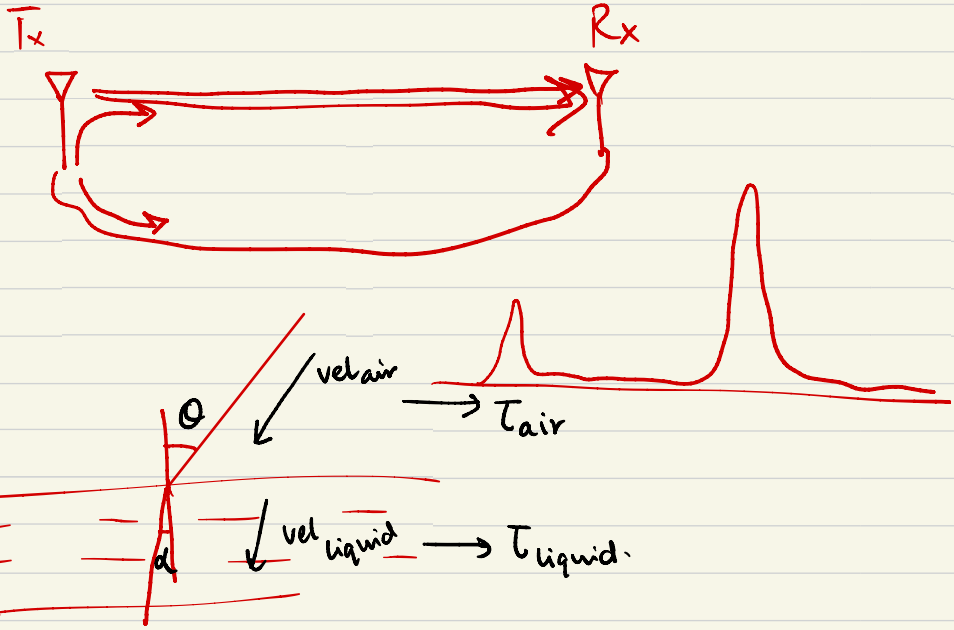
$$\tan\theta = \frac{f_{10} - f_5}{\tau}$$



(4) LiquID



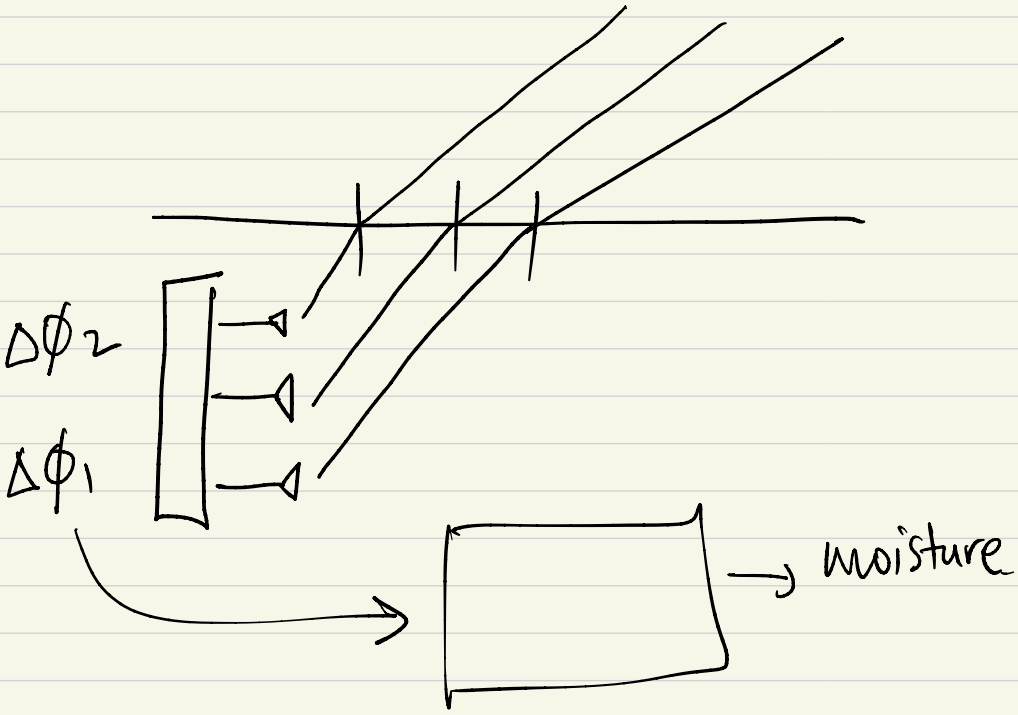
Coke / Pepsi / tea / vodka / tap water / mineral water.



τ(air - wire) — τ(liquid - wire)

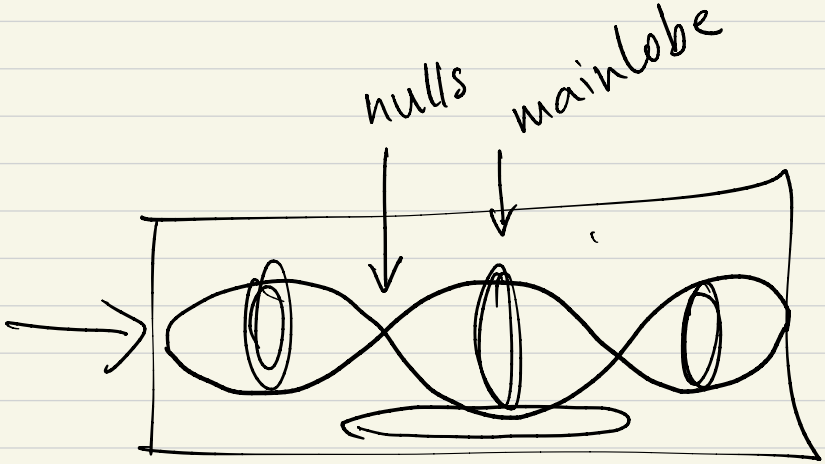
= τ(air - liquid)

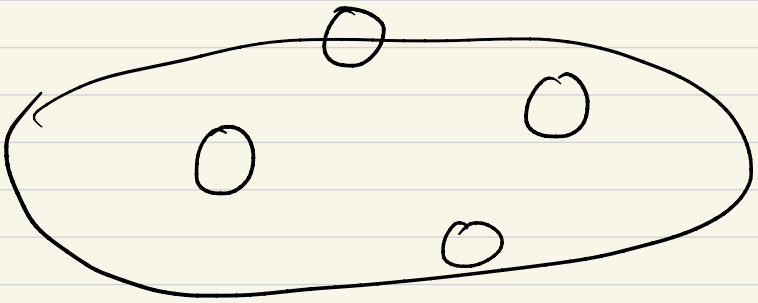
⑤ **FarmBeats**



(4) Spikey

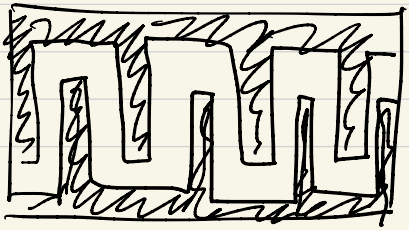
(5)





(6) Gyro Attack:

MEMS



$$x(t) * h_{Head}(t) = y(t)$$

$$X_f \cdot H_f = Y_f$$

HRTF

$x(t)$ = "follow me" →

$* h^{\theta}_{l}(t) = y_l$

$* h^{\theta}_{r}(t) = y_r$