ODOR PROOF

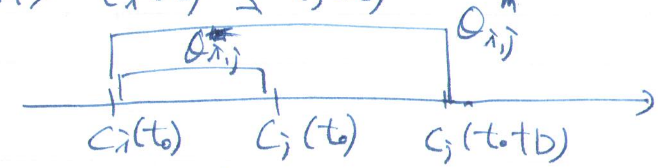
Apr. 10

- $\text{offset} = \max(\theta^M_{*,*})$
- $\theta^M_{i,j} = \max(\theta^m_{i,j}, \theta^m_{j,i})$
- $\theta^m_{i,j} = \min_{0 \le x < N}(\theta^{mx}_{i,j})$ x-th measurement from core-i to core j
- $\theta^{mx}_{i,j} = |C_j(t_1) - C_i(t_0)|$

  $= |C_j(t_0 + D) - C_i(t_0)|$
- $C_i(t)$: time stamp of core-i at time t
  ↳ invariant TSC, which means
  - $C_i(t)$ is a constant monotonic increasing function with a given timestamp frequency

A) $\theta^{mx}_{i,j} = |C_j(t_1) - C_i(t_0)| = |C_j(t_0+D) - C_i(t_0)|$

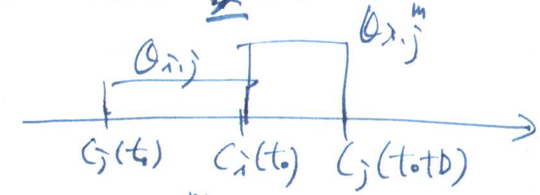
<CASE A-1> $C_i(t) \le C_j(t)$



OK

$\therefore \theta^M_{i,j} \ge \theta_{i,j}$

<CASE A-2> $C_i(t) \ge C_j(t)$



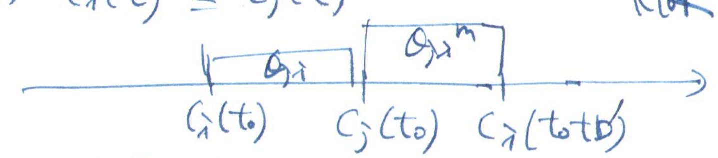
NOK

$\therefore \theta^m_{i,j} \ge \theta_{i,j}$ is not guaranteed

B) $\theta^{mx}_{j,i} = |C_i(t_1) - C_j(t_0)| = |C_i(t_0+D') - C_j(t_0)|$

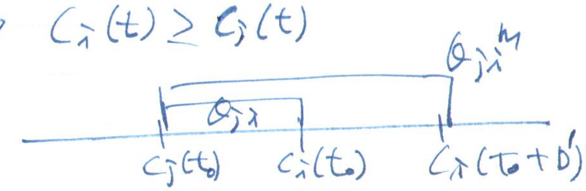
<CASE B-1> $C_i(t) \le C_j(t)$

NOK



$\therefore \theta^m_{j,i} > \theta_{j,i}$ is not guaranteed.

<CASE B-2> $C_i(t) \ge C_j(t)$



OK

$\therefore \theta^m_{j,i} \ge \theta_{j,i}$

$\Rightarrow$ when $D \ge 0$, $D' \ge 0$

· We don't know whether

$C_i(t) \le C_j(t)$ or $C_i(t) \ge C_j(t)$

~~· But we c~~

* Suppose $C_i(t) \le C_j(t)$ in meas θ_{ij}^m

- then only CASE A-1 is correct, meaning $\theta_{ij}^m \ge \theta_{ij}$ is guaranteed.
- For CASE A-2,

① $\theta_{ij}^m \ge \theta_{ij}$ $\Rightarrow$ $\theta_{ij}^m \ge \theta_{ij}$ is guaranteed

or

② $\theta_{ij}^m \le \theta_{ij}$ $\Rightarrow$ $\theta_{ij}^m \ge \theta_{ij}$ is NOT guaranteed.

* Suppose $C_i(t) \ge C_j(t)$ in meas θ_{ji}^m

- then only CASE B-2 is correct, meaning $\theta_{ji}^m > \theta_{ji}$ is guaranteed
- For CASE B-1

① $\theta_{ji}^m \ge \theta_{ji}$ $\Rightarrow$ $\theta_{ji}^m \ge \theta_{ji}$ is guaranteed

② $\theta_{ji}^m \le \theta_{ji}$ $\Rightarrow$ $\theta_{ji}^m \ge \theta_{ji}$ is not guaranteed

$\Downarrow$

~~$\theta_{ij}^M = \max(\theta_{ij}^m, \theta_{ji}^m)$ is guaranteed that~~

~~$\theta_{ij}^M \ge \theta$~~

So $\max(\theta_{ij}^m, \theta_{ji}^m) > \theta_{ij}$

(because either of one measured value (θ_{ij}^m or θ_{ji}^m) is correct and taking the correct one or greater one does not break the invariant.)

✓ $offset_C = \max(\theta^M_{x,y})$

where C is a set of cores and x and y are a member of C

✓ ~~with~~

✓ ~~With~~

✓ ~~Among cores in C~~

① ~~if $|C_x(t) - C_y(t)| \geq offset_C$~~

~~then $C_x(t)$~~

✓ Among cores in a set C,

① if $C_x(t) - C_y(t) \geq offset_C$

then $C_x(t)$ happens before $C_y(t)$

② if $C_y(t) - C_x(t) \geq offset_C$

then $C_y(t)$ happens before $C_x(t)$

③ if $|C_x(t) - C_y(t)| < offset_C$

then we cannot decide which one happens before another.

□