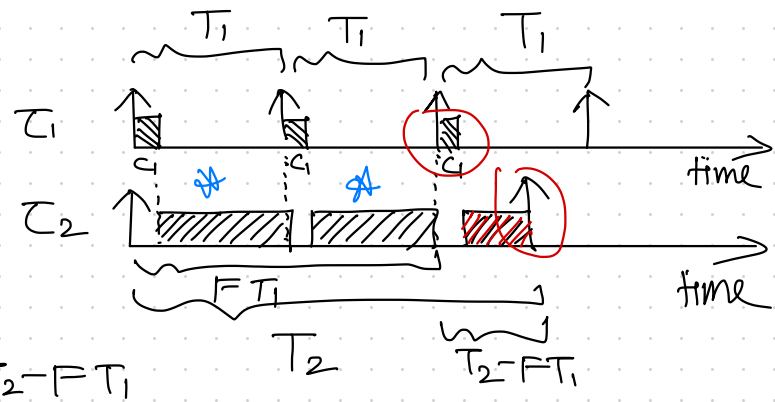
$\tau = \{\tau_1, \tau_2\}$

$\tau_1 = (T_1, C_1)$

$\tau_2 = (T_2, C_2)$

$T_1 < T_2$



Case a $\quad C_1 < T_2 - FT_1$

where $F = \left\lfloor \frac{T_2}{T_1} \right\rfloor$ $\quad F = 2$ $\quad F = 3$?

$(T_1 - C_1) + (T_1 - C_1) + (T_2 - FT_1 - C_1)$

$C_2 \leq F(T_1 - C_1) + (T_2 - FT_1 - C_1) \Rightarrow$ RM schedulability

$= FT_1 - C_1 F + T_2 - FT_1 - C_1$

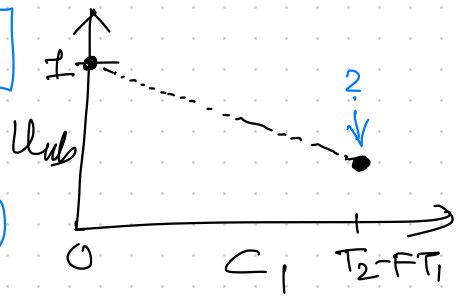
$= T_2 - C_1(1+F)$

$U_{ub} = \frac{C_1}{T_1} + \frac{C_2}{T_2}$

$= \frac{C_1}{T_1} + \frac{T_2 - C_1(1+F)}{T_2}$

$= 1 + C_1 \left[\frac{1}{T_1} - \frac{1+F}{T_2} \right]$

$$= 1 + \frac{C_1}{T_2}\left[\frac{T_2}{T_1} - 1 - F\right]$$



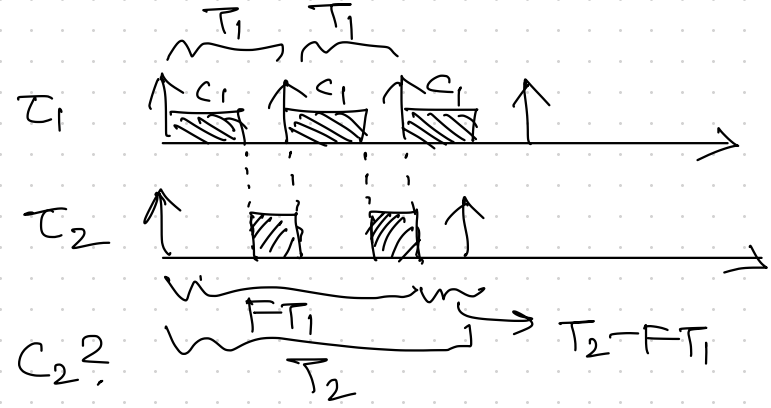
$$U_{ub} = 1 + \frac{(T_2 - FT_1)\left(\frac{T_2}{T_1} - 1 - F\right)}{T_2}$$

$$= 1 + \cancel{1} - \cancel{\frac{T_2}{T_2}} - F\frac{T_2}{T_2} - F\cancel{\frac{T_1}{T_2}}\cancel{\frac{T_2}{T_1}} + \frac{FT_1}{T_2} + \frac{F^2T_1}{T_2}$$

$$= 1 - 2F + F\frac{T_1}{T_2} + F^2\frac{T_1}{T_2}$$

Case b

$C_1 \geq T_2 - FT_1$



What's the max C_2?

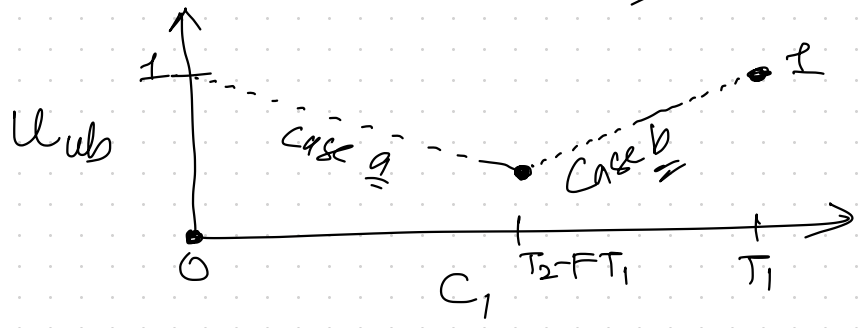
$$C_2 \leq F(T_1 - C_1) + 0$$

$$U_{ub} = \frac{C_1}{T_1} + \frac{F(T_1 - C_1)}{T_2}$$

$$= \frac{FT_1}{T_2} + \frac{C_1}{T_1} - \frac{FC_1}{T_2}$$

$$= \frac{F T_1}{T_2} + \frac{C_1}{T_2}\left[\frac{T_2}{T_1} - F\right] = 1 \quad (\text{if } C_1 = T_1)$$

$$\geq 0$$



$$U_{ub} = \frac{F T_1}{T_2} + \frac{T_2 - F T_1}{T_2}\left(\frac{T_2}{T_1} - F\right)$$

$$= F\frac{T_1}{T_2} + \left(1 - F\frac{T_1}{T_2}\right)\frac{T_2}{T_1}\left(1 - F\frac{T_1}{T_2}\right)$$

$$= F\frac{T_1}{T_2} + \frac{T_2}{T_1}\left(1 - F\frac{T_1}{T_2}\right)^2$$

$$\vdots$$

Eq. (4.5) $$= \frac{T_1}{T_2}\left[F + \left(\frac{T_2}{T_1} - F\right)^2\right]$$