P1) $\frac{\partial}{\partial t} T(x,t) = -\mu(t) \cdot \frac{\partial}{\partial x} T(x,t) + \alpha R(t) - \beta P(t)$

$T(x,t) = T\left(x - \int_{t_0}^{t} \mu(\sigma)\, d\sigma, t_0\right) + \alpha \int_{t_0}^{t} \pi(\sigma) d\sigma$

$T(x,0) = T(x, t_0) = g(x)$

$T(0,t) = T\left(\int_{t_0}^{t} \mu(\sigma) d\sigma, t_0\right) + \int_{t_0}^{t} \pi(\sigma) \alpha\, d\sigma = \phi(t)$

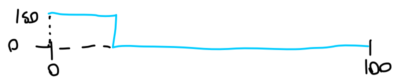
$\frac{\partial T(x,t)}{\partial t} = \alpha \pi(t) - \dot{T}\left(x - \int_{t_0}^{t} \mu(\sigma) d\sigma, t_0\right) \cdot \mu(t)$

$\frac{\partial T(x,t)}{\partial t} = \dot{T}\left(x - \int_{t_0}^{t} \mu(\sigma)\, d\sigma, t_0\right)$ $\rightarrow$ Prodal

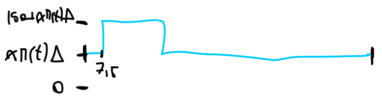
b) $t_0 = t$ $\quad T(x, t+\Delta) = T(x - \mu(t)\Delta, t) + \alpha \pi(t) \Delta$

$t = t + \Delta$

c)



$\Delta = 15$



d) $\dot{T}_i = -\frac{\mu}{h}(T_i - T_{i-1}) + \alpha R$

$i = 1, \dots, 100$

P3

a) $\Delta x\, W(x, t+\Delta t) - W(x,t) = -V(t) \cdot \Delta t \cdot (W(x,t) - W(x+\Delta x, t)) - \beta\, q(t)\, W(x,t)\, \Delta x\, \Delta t$

$: \Delta x\, \Delta t$

$\Delta x \to 0,\ \Delta t \to 0 \quad \frac{\partial W(x,t)}{\partial t} = -V(t) \frac{\partial W(x,t)}{\partial x} - \beta\, q(t)\, W(x,t)$

b) $\dot{W}_i = -\frac{V(t)}{\delta}(W_i - W_{i-1}) + \beta\, q(t)\, W_i$

$i = 1 \dots m$

P4) $\frac{\partial}{\partial t} T(x,t) = \frac{1}{2}\sigma^2 \frac{\partial^2}{\partial x^2} T(x,t)$

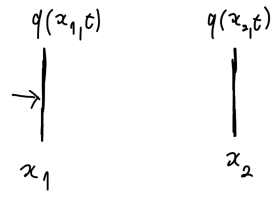
Slid 22:

$T(x,t) = ? \circledast CI$

P5) $\frac{dx}{dt} = c + \sigma v(t)$

$\frac{\partial}{\partial t} p(x,t) = -c \frac{\partial p(x,t)}{\partial t}$

P2)



$q(x,t) = \frac{\partial P(x,t)}{\partial t}$

$q(x_1,t) - q(x_2,t) = \partial$

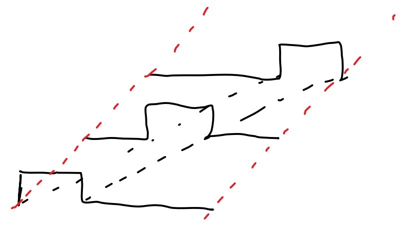
$\Delta x\, P(x,t) = \Delta t\, (q(x,t) - q(x+\Delta x, t))$

b) $P(x,t) = F(x - ct)$

$F(x) = P(x,0)$

$\frac{\partial P(x,t)}{\partial t} = \frac{\partial q(x,t)}{\partial x}$

$\frac{\partial P(x,t)}{\partial t} = -\mu \frac{\partial P(x,t)}{\partial x}$



$\frac{\partial P}{\partial t} = F(x-ct) \frac{d}{dt}(x - ct) = F(x-ct) \cdot 0 = 0$