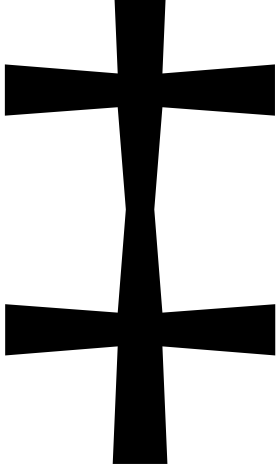
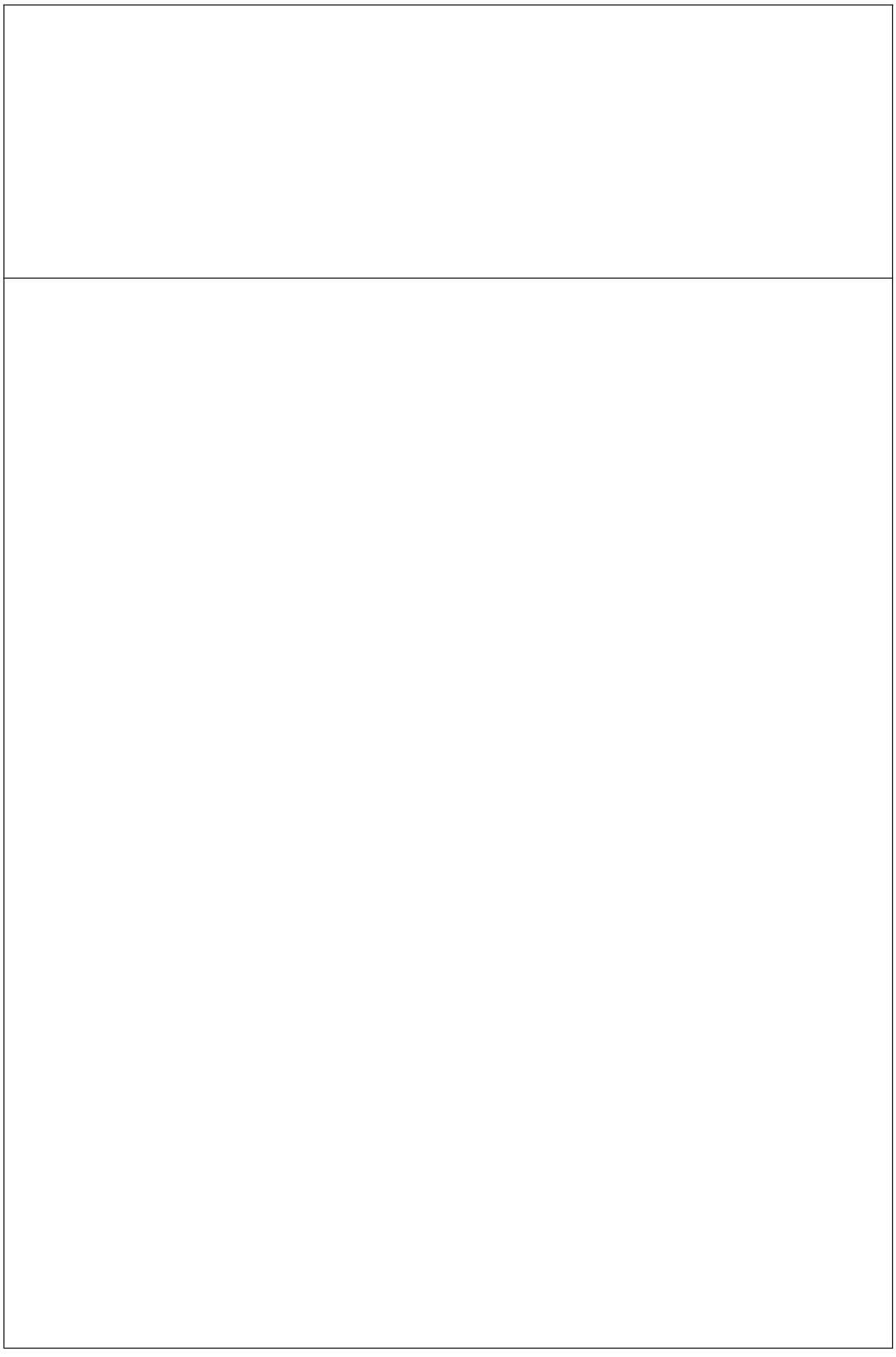
附件 5





Δ

Δt

$$\Delta t \cdot v_f \leq \Delta$$

$$\frac{\partial \rho}{\partial t} + \frac{\partial q(\rho)}{\partial x} = 0$$

$$\rho(x, 0) = \rho_0(x), \text{ with } x \in (a, b)$$

$$\begin{cases} \rho(a,t) = \rho_a(t) \text{ or} \\ q'\left(\rho\left(a,t\right)\right) \leqslant 0 \text{ and } q'\left(\rho_a\left(t\right)\right) \end{cases}$$

$\rho(x\ t)$

$$k_i^{h+1} = \begin{cases} k_{i-1}^h & \text{if free flow} \\ (1-\delta)k_i^h + \delta k_{i+1}^h & \text{if congested} \end{cases} \quad i = 1, 2, \ldots, I \text{ and } h = 0, 1, \ldots, H-1.$$

i

$$\boldsymbol{k}_{h+1} = A_h \cdot \boldsymbol{k}_h + B_h \cdot u_h + \boldsymbol{w}_h$$

$$\boldsymbol{k}_h = [k_1^h \ \ k_2^h \ \ \ldots \ \ k_I^h]^T$$

$$u_h = \begin{cases} k_0^h, & \text{if free flow } (m = 1) \text{ on the section during } h; \\ k_{I+1}^h, & \text{if congested } (m = 2) \text{ on the section during } h. \end{cases}$$

$$k_0^h = \frac{1}{\Delta t}\int_{(h-1)\Delta t}^{h\Delta t} \rho_a(t)dt \quad \text{and} \quad k_{I+1}^h = \frac{1}{\Delta t}\int_{(h-1)\Delta t}^{h\Delta t} \rho_b(t)dt \quad h = 0, 1, \ldots, H-1$$

$$k_i^0 = \frac{1}{\Delta x}\int_{x_{i-1}}^{x_i} \rho_0(x)dx \quad i = 1, 2, \ldots, I.$$

ρ t ρ t ρ x

$$\boldsymbol{y}_h = C_h \cdot \boldsymbol{k}_h + \boldsymbol{v}_h$$

$$\begin{aligned}
\hat{\boldsymbol{k}}_{h+1}^- &= A_h \cdot \hat{\boldsymbol{k}}_h + B_h \cdot u_h \\
P_{h+1}^- &= A_h \cdot P_h \cdot A_h^T + Q \\
F_{h+1} &= P_{h+1}^- \cdot C_{h+1}^T \left[C_{h+1} \cdot P_{h+1}^- \cdot C_{h+1}^T + R\right]^{-1} \\
\hat{\boldsymbol{k}}_{h+1} &= \hat{\boldsymbol{k}}_{h+1}^- + F_{h+1}\left(\boldsymbol{y}_{h+1} - C_{h+1} \cdot \hat{\boldsymbol{k}}_{h+1}^-\right) \\
P_{h+1} &= \left(I - F_{h+1} \cdot C_{h+1}\right) P_{h+1}^-
\end{aligned}$$

$-$ $\hat{\boldsymbol{k}}_h^-$

– $\hat{\boldsymbol{k}}_h$

– P_h^-

– P_h

$\hat{\boldsymbol{k}}_0$ P

$_{h+}$ C_{h+}

C_{h+}