?
$t\bar{q}(x,t)+x\bar{f}(\bar{q}(x,t))=0$
(1)
$\bar{q}(x,t)\in$
R^m
$\int_{-\infty}^{\infty}q_j(x,t)dx$
$q_j(x,t)$
t
$f_j(q(x,t))$
??
$qt+\mathbf{A}qx=0$
(2)
$\mathbf{A}$
$qt+uqx=0$
(3)
$q(x,t)=q(x-ut,0)$
(4)
??
??
$\dot{\mathbf{J}}(q)$
(i,j)
f_ig_j
$\bar{q}t+\mathbf{J}(\bar{q})\bar{q}x=0$
(5)T
$\rho t+$
$\div(\rho\vec{u})=$
0Δ M
$t(\rho\vec{u})+$
$\div(\rho\vec{u}\vec{u}+$
$P)=$
0Δ , O
$Et+)$
$\div((E+$
$P)\vec{u})=$
0Δ E
$E_{=}$
$\frac{P}{\gamma-1}+$
$\frac{1}{2}\rho u^2$
P
??

$t\bar{q}(\vec{x},t)+\div\mathbf{f}(\bar{q}(\vec{x},t))=0$
(6)
$\bar{q}(\vec{x},t)=(\rho\rho\vec{u}E)=(q_1q_2q_3)$
(7)$f(q,q_x)$.
Δ
$\mathbf{f}(\bar{q})=(\rho\vec{u}\rho\vec{u}\vec{u}+P\vec{u}(E+P))=(q_2\frac{q_2^2}{q_1}+P(\bar{q})\frac{q_2}{q_1}(q_3+P(\bar{q})))$
(8)
$P(\bar{q})$
$t\mathbf{q}(\vec{x},t)+\div\mathbf{f}(\mathbf{q}(\vec{x},t))=S(\mathbf{q}(\vec{x},t))$
(9)
$\Delta x=$
$\Delta y=$
h
$\Delta t=$
k
$(x_{\mathrm{i}},y_{\mathrm{j}})=$
$(x_0+$
$\mathrm{i}h,y_0+$
$\mathrm{j}h)$
$t_{\mathrm{n}}=$
t_0+
$\mathrm{n}k$
$Q_{\mathrm{ij}}^{\mathrm{n}}\simeq q(x_{\mathrm{i}},y_{\mathrm{j}},t_{\mathrm{n}})$
(10)H
$qt+uqx=0$
(11)
$$\frac{Q_{\mathrm{i}}^{\mathrm{n}+1}-Q_{\mathrm{i}}^{n}}{k}+u\left(\frac{Q_{\mathrm{i}}^{\mathrm{n}+1}-Q_{\mathrm{i}}^{\mathrm{n}}}{k}\right)=0$$
(12)
q_i^0
ijn
$$Q_{\mathrm{i}}^{\mathrm{n}+1}=Q_{\mathrm{i}}^{\mathrm{n}}-\frac{k}{h}u\left(Q_{\mathrm{i}}^{\mathrm{n}}-Q_{\mathrm{i}-1}^{\mathrm{n}}\right)$$
(13)Navier-
Stokes
$$Q_{\mathrm{i}}^{\mathrm{n}+1}=Q_{\mathrm{i}}^{\mathrm{n}}-\frac{k}{h}\left(Q_{\mathrm{i}}^{\mathrm{n}}-Q_{\mathrm{i}-1}^{\mathrm{n}}\right)$$
(14)