u→v

- $(E\Gamma_1\gamma^2 - D\gamma/\Gamma_1\gamma^2 - 1)^2(1 - 1/\gamma^2) - Q^2 = 0$ (Solve numerically)
- $density = D/\gamma$
- $W = E\Gamma_1\gamma^2 - D\gamma/\Gamma_1\gamma^2 - 1$
- $\omega = W/\gamma^2$
- $pressure = W - E$
- $v^j = Q^j/W$
- $primitives = [density, v^j, pressure]^T$

v→$v_{interface}$ (Reconstruction)

- $v_i' = minmod(\Delta_- v_i, \Delta_+ v_i)$
- $\Delta \pm v_i = \pm(v_{i\pm1} \pm 1)$
- $Q_i(x) = v_i + v_i^{'} \left(\frac{x - x_i}{\Delta x}\right)$
- $v^L_{i+1/2} = Q_i(x_{i+1/2}) v^R_{i-1/2} = Q_i(x_{i-1/2})$

v_{+L}, $v_{+R} \rightarrow f_+$

- $f^{HLL} = \frac{a^+ f^L + a^- f^R - a^+ a^- (u^R - u^L)}{a^+ + a^-}$

$u_i \rightarrow u_{i+1}$

- $u^{(1)} = u^n + \Delta t L[u^n]$

- $u^{(2)} = \frac{3}{4}u^n + \frac{1}{4}u^{(1)} + \frac{1}{4}\Delta t L[u^{(1)}]$
- $u^{n+1} = \frac{1}{3}u^n + \frac{2}{3}u^{(2)} + \frac{2}{3}\Delta t L[u^{(2)}]$