Solution Convergence

Recall for our triangular grid finite volume scheme, the basic iterative scheme looked like:

$$A_i \frac{U_i^{n+1}-U_i^{n}}{\Delta t} + \underbrace{\overbrace{\Im_{ab_i}^{n} + \Im_{bc_i}^{n} + \Im_{ca_i}^{n}}^{R_i^n \equiv \text{residual of cell}}}_{\text{Approximation of } \oint_{\partial c_i} \left(F\vec{i} + G\vec{j}\right)\bullet \vec{n}\,ds} = 0$$

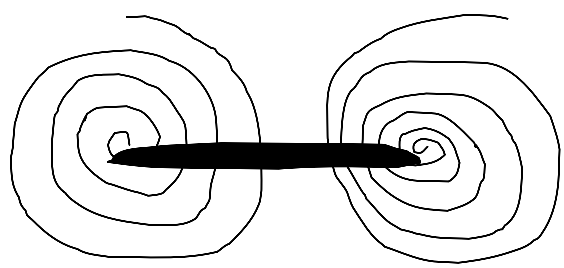
$$\Rightarrow \boxed{U_i^{n+1} = U_i^{n} - \frac{\Delta t}{A_i} R_i^{n}}$$

Update formula for cell i to iteration $n+1$ from iteration n

Suppose we are interested in the steady answer to our problem, i.e.
$t = 0$

$$U^0 = U_\infty^0 = \begin{cases} \rho_\infty \\ \rho_\infty u_\infty \\ \rho_\infty v_\infty \\ \rho_\infty E_\infty \end{cases}$$

$\longrightarrow$ We want



Initial guess of uniform flow

answer as $t \to \infty$
when $\frac{dU}{dt} = 0$
(steady-state)