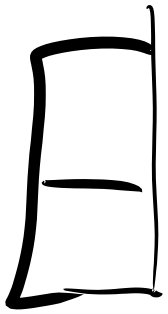
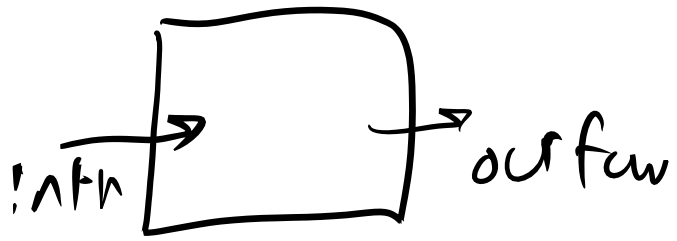


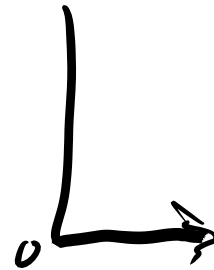
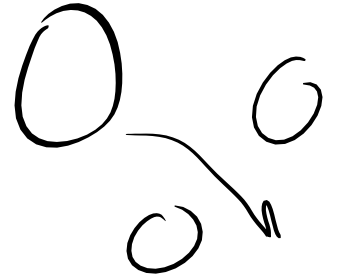
Eulerian

fixed register



Lagrangian

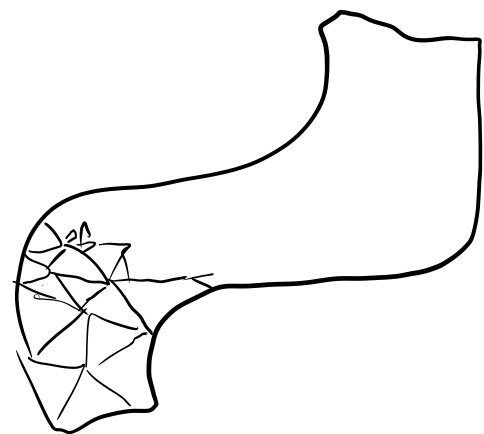
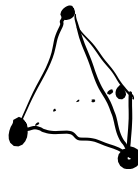
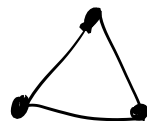
many bits



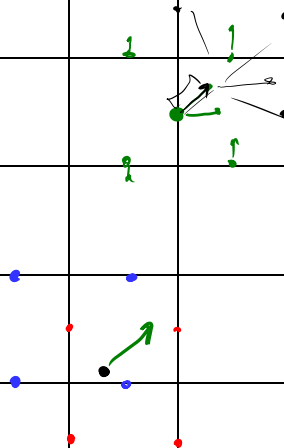
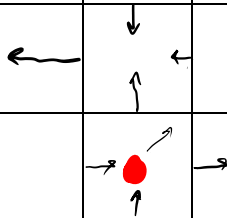
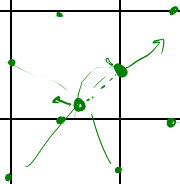
Cell — grid (Cartesian)

— simplicial grid

↳ simplex



Self - Advection

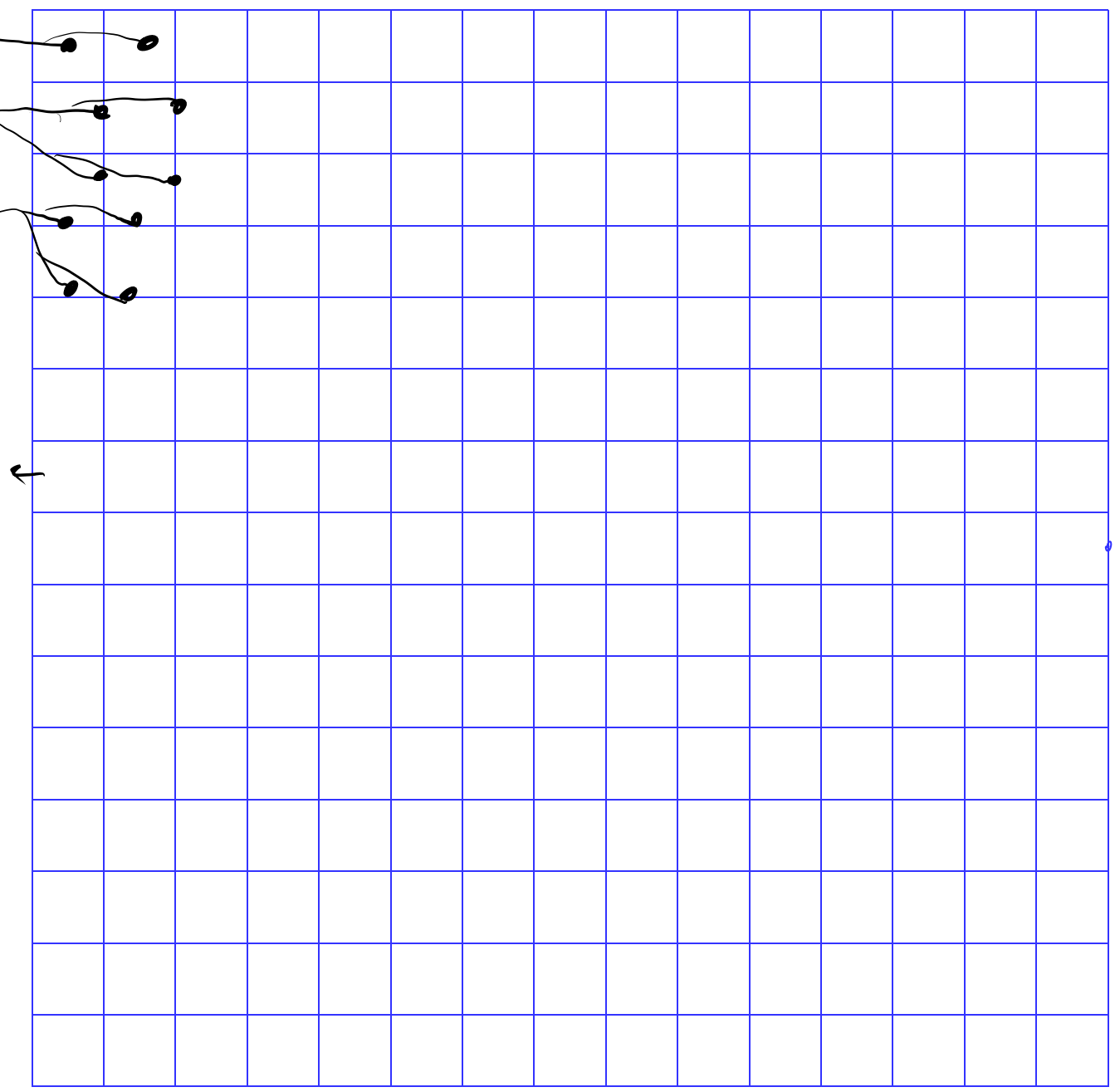


Contents 16×16

flow X

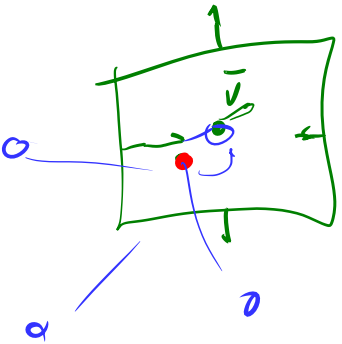
Y

Staggered Grid



15×16

Advection

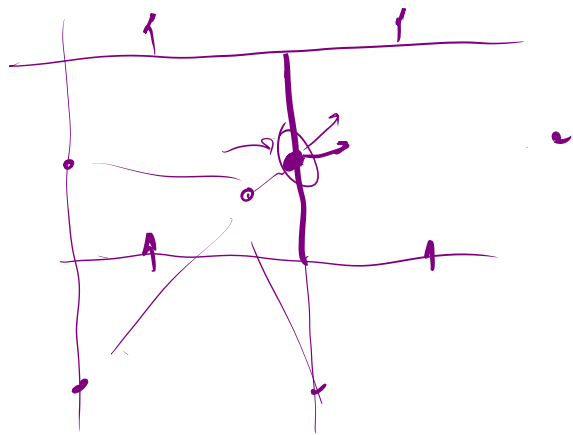


for Current

- find vel \vec{v} in center cell
- go back by $-\Delta t \cdot \vec{v}$

• interpolate current at $(\text{center} - \Delta t \cdot \vec{v})$
replan current w/ that

for x vel



↑
← S →
↓

↑
← S →
↓

$+x$
 \rightarrow

$+y$
 \downarrow

c_1	x_1	c_2	x_2	c_3
y_1		y_2		y_3
c_4	x_3	c_5	x_4	c_6

$$d_1 = x_1 + y_1$$

$$d_2 = -x_1 + x_2 + y_2$$

P_1	P_2	P_3
P_4	P_5	P_6

$$\begin{pmatrix} 2 & -1 & 0 & -1 & 0 & 0 \\ -1 & 3 & -1 & 0 & -1 & 0 \\ 0 & -1 & 2 & 0 & 0 & -1 \end{pmatrix} \begin{pmatrix} P_1 \\ P_2 \\ \vdots \\ P_6 \end{pmatrix}$$

$$= \begin{pmatrix} d_1 \\ d_2 \\ d_3 \\ \vdots \\ d_6 \end{pmatrix}$$

$+x$
↘

$+y$ ↓

c_1	x_1	c_2	x_2	c_3
y_1		y_2		y_3
c_4	x_3	c_5	x_4	c_6

$$d_1 = x_1 + y_1$$

$$d_2 = -x_1 + x_2 + y_2$$

P_1	P_2	P_3
P_4	P_5	P_6

$$\begin{pmatrix} 2 & -1 & 0 & -1 & 0 & 0 \\ -1 & 3 & -1 & 0 & -1 & 0 \\ 0 & -1 & 2 & 0 & 0 & -1 \end{pmatrix} \begin{pmatrix} P_1 \\ P_2 \\ \vdots \\ P_6 \end{pmatrix}$$

$$= \begin{pmatrix} d_1 \\ d_2 \\ d_3 \\ \vdots \\ d_6 \end{pmatrix}$$

advers
(Project)
(diffuse)

Project:

1. find diver

2. find pressure (CG solve)

3. sum diver b_1 + ∇ pressure