Hurricanes are a very "organized" flow.

Meaning, $\vec{V}(x,y,z,t)$ ⟵ "container" for any possible weather forever

↳ vertical "profile"

↳ horizontal "pattern"

is far simpler than its most general case,

insight about flow → math idealization

circular pattern → $(x,y) \to (r,\theta)$ & $\vec{V}(r,z,t)$

$\vec{V}(x-x_c, y-y_c, z, t) \approx \vec{V}(z,t)$

$(x_c(t), y_c(t)) \equiv \vec{V}_c$ velocity of center

Strong winds confined near center → $\frac{\partial V}{\partial r} < 0$; treat central part separately

$$\vec{\nabla} \times \vec{V} = \det \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ \partial_x & \partial_y & \partial_z \\ u & v & w \end{vmatrix}$$

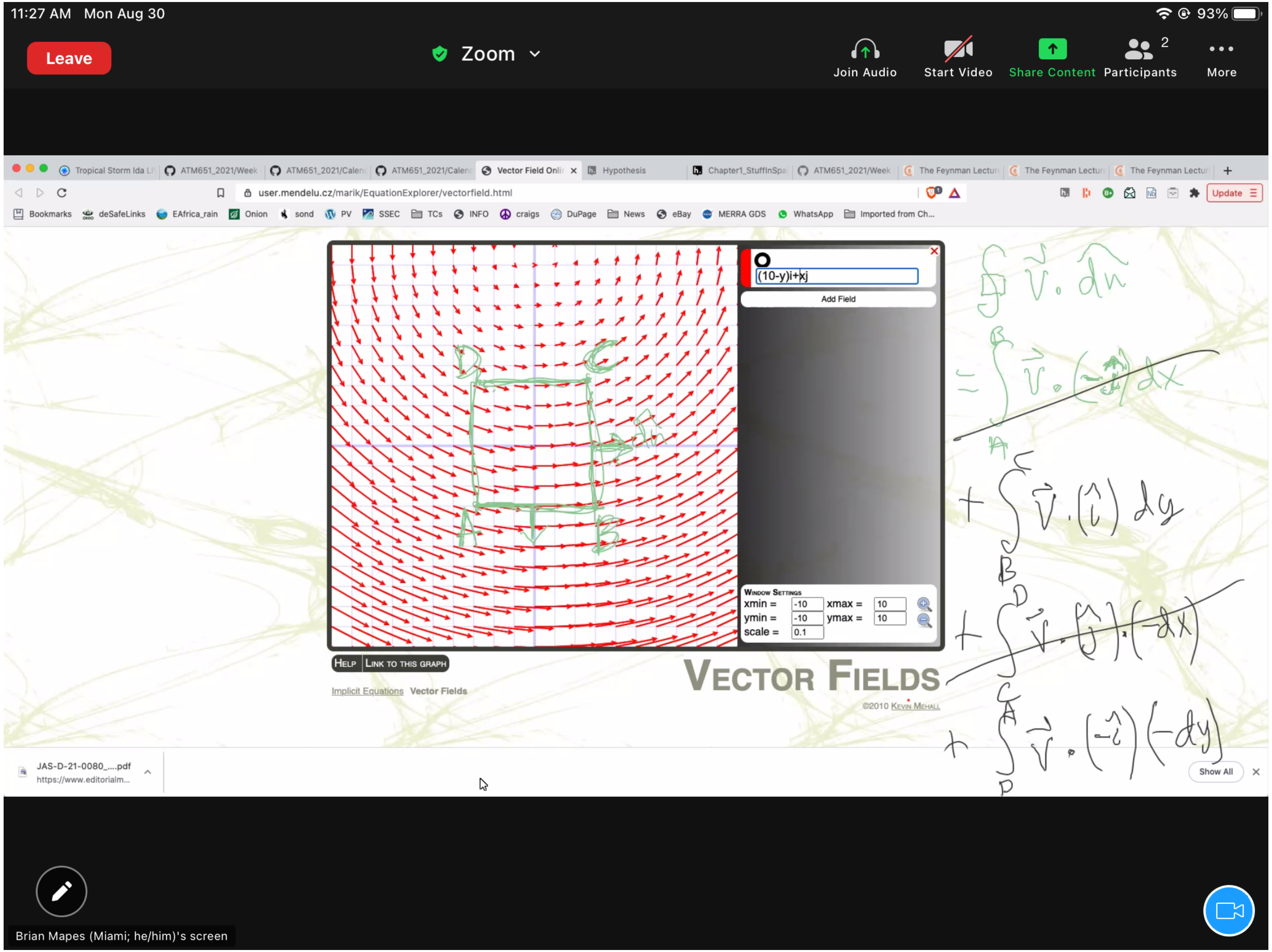
$$\hat{i}\left(\partial_y(w) - \partial_z(u)\right) + \hat{j}\left(\qquad\right) + \hat{k}\left(\qquad\right)$$

$$\partial_x = \frac{\partial}{\partial x} = \frac{\partial}{\partial x}(\,) =$$

example for $T(x, y, z, t)$

$$\frac{\partial T}{\partial x} = \lim_{\Delta x \to 0}\left(\frac{T(x+\Delta x, y, z, t) - T(x-\Delta x, y, z, t)}{2\Delta x}\right)$$

$$\stackrel{?}{=} \lim_{\Delta x \to 0}\left(\frac{T(x+\Delta x, y, z, t) - T(x, y, z, t)}{\Delta x}\right)$$



11:27 AM Mon Aug 30
93%
Leave
Zoom
Join Audio
Start Video
Share Content
Participants
More
user.mendelu.cz/marik/EquationExplorer/vectorfield.html
(10-y)i+xj
Add Field
Window Settings
xmin = -10
xmax = 10
ymin = -10
ymax = 10
scale = 0.1
Help
Link to this graph
Implicit Equations
Vector Fields
VECTOR FIELDS
©2010 Kevin Mehall
JAS-D-21-0080_....pdf
Show All
Brian Mapes (Miami; he/him)'s screen

volume. For any finite volume we can use the fact we proved above—that the total flux from a … integral of the normal component of any vector over any closed surface can also be written …

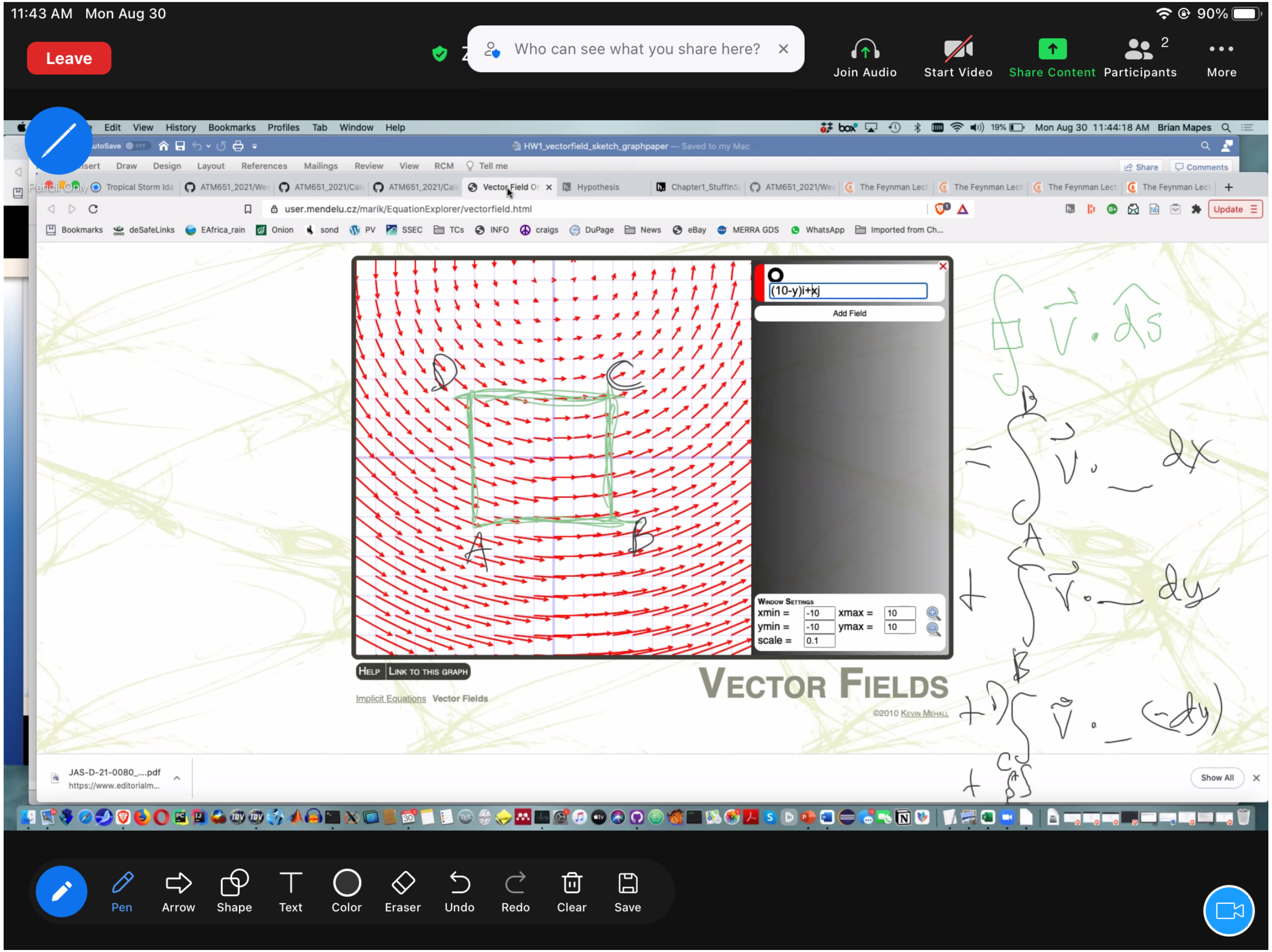
$$\int_S \boldsymbol{C}\cdot\boldsymbol{n}\,da = \int_V \boldsymbol{\nabla}\cdot\boldsymbol{C}\,dV,$$

Global
Climate
Change

$$\underset{Atm}{\iiint} \frac{\partial}{\partial t}(c_p T) = \boxed{\cancel{\iiint \nabla\cdot(c_p T)\vec{v}}} + R_{TOA}$$

weather

Suppose we take again the case of heat flow in, say, a metal. Suppose we have a simple situation


11:43 AM Mon Aug 30
90%
Leave
Who can see what you share here?
Join Audio
Start Video
Share Content
Participants
More
HW1_vectorfield_sketch_graphpaper — Saved to my Mac
user.mendelu.cz/marik/EquationExplorer/vectorfield.html
(10-y)i+xj
Add Field
Window Settings
xmin = -10 xmax = 10
ymin = -10 ymax = 10
scale = 0.1
Help
Link to this graph
Implicit Equations
Vector Fields
VECTOR FIELDS
©2010 Kevin Mehall
Show All
Pen
Arrow
Shape
Text
Color
Eraser
Undo
Redo
Clear
Save