16 April 2018 CMYG50 morrison

(1)

GLVE (in terms of its strain measure)

$$\underline{\underline{\tau}} = + \int_{-\infty}^{t} \frac{\partial G(t-t')}{\partial t'} \underbrace{\underline{\underline{\gamma}}(t,t')}_{\text{strain}} dt'$$

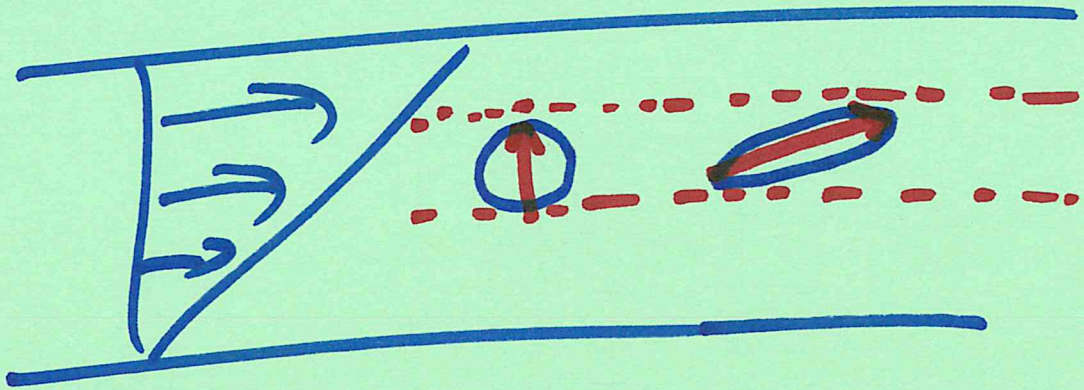
We tried it out in rigid body rotation.

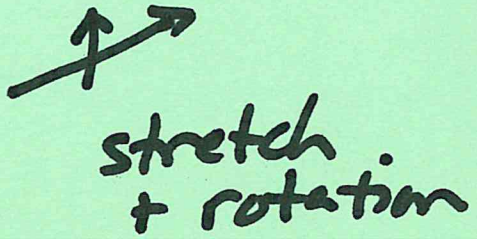
Result: $\underline{\underline{\gamma}}$ keeps track of too much!

We care about relative locations of fluid particles but not rotations.

Even simple shear has rotation

Shear:





Fluid particles in shear both ROTATE and are STRETCHED. Stretching produces stress, rotation does not.

We seek a strain measure that accounts for stretch + ignores rotation.

(how? polar decomposition of $\underline{\underline{F}}$, $\underline{\underline{F}}^{-1}$)

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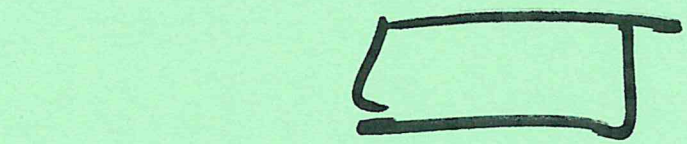
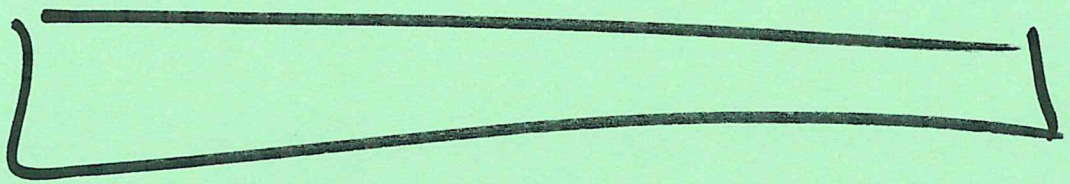
affine motion





Finger Tensor

C^{-1}

is affine motion

on every lengthscale

(breaks down in $\overline{\eta}$ uniax elong. (goes infinite)