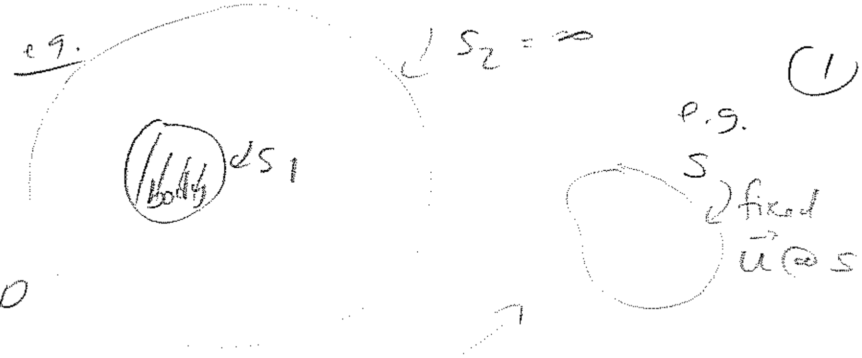

(1)

Stokes' equs:

$$\begin{cases} \mu \Delta \vec{u} = \vec{\nabla} p \\ \vec{\nabla} \cdot \vec{u} = 0 \end{cases}$$

assume $\exists$ two solutions $(\vec{u}_1, p_1)$ & $(\vec{u}_2, p_2)$ obeying same b.c.; their difference, also obeys equ.s:

$$\vec{v} = \bar{u}_1 - \bar{u}_2$$

$$\vec{P} = p_1 - p_2$$

i.e.

$$\mu \Delta \vec{v} = \vec{\nabla} P \quad / \cdot \vec{v}$$

$$\mu \, \vec{v} \Delta \vec{v} - \vec{\nabla}(\vec{v} P) = 0 \qquad (\bar{\nabla} \cdot \bar{v} = 0)$$

$$0 = \mu \int_V dV \, \vec{v} (\vec{\nabla}^2) \vec{v} - \underbrace{\int_V \vec{\nabla}(\vec{v} \cdot p) \, dV}_{\underbrace{\oint_S \bar{v} \cdot P \, d^2\bar{S}}_{\bar{v} = 0 \text{ (same b.c.)}}}$$

$$\mu \int_V dV \, v_i \partial_j \partial_j v_i = 0$$

$$\int_V dV \left[\partial_j (v_i \partial_j v_i) - (\partial_j v_i)^2 \right] = \oint_{\partial V} d^2 S^j \, v_i \partial_j v_i - \int_V (\partial_j v_i)^2 dV$$

$$\oint_{\partial V} d^2 S^j \, v_i \partial_j v_i = 0 \quad \text{as } \bar{v} = 0 \text{ @ } S$$

$$\Rightarrow \quad 0 = \int_V \underbrace{(\partial_j v_i)^2}\, dV$$

- a Σ of 9 positive terms (squared)
- whose $\int$ over V vanish

$\Rightarrow$ every single fn $\equiv 0$.

$$\partial_j v_i = 0 \Rightarrow v_i = \text{const.}$$

but $v_i = 0$ @ S

$\Rightarrow$ $v_i = 0$ everywh

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