AM40SD:Assessed Tutorials (Sheet 2) - 0%

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Questions

These tutorial sheets will be marked with feedback, but **do not** carry any weighting towards the final mark. **Please show all working.**

Deadline: 10 Dec 2012 (6PM) MB312A.

1) Provide the definitions of $\boldsymbol{\epsilon}\cdot$ and $\boldsymbol{\delta}\cdot$ in terms of $\boldsymbol{\lambda} = (\lambda_1, \lambda_2, \lambda_3)$.

[2 marks]

2) What is $\delta_1, \delta_2, \delta_3$ using the definition of $\boldsymbol{\delta}\cdot$?

[5 marks]

3) What is $\epsilon_1, \epsilon_2, \epsilon_3$ using the definition of $\boldsymbol{\epsilon}\cdot$?

[5 marks]

4) Apply operator, $\boldsymbol{\epsilon}\cdot$ onto the equation,

$$\frac{\partial \tilde{u}}{\partial t} + ((\tilde{u}\cdot \nabla)(\vec{u}_0 + \tilde{u})) + (\vec{u}_0 \cdot \nabla)\tilde{u} = -\nabla\pi + \nu\nabla^2\vec{u}$$

This equation takes into consideration that there is basic flow, $\vec{u_0} = (U_0(z), 0, 0)$ with the preturbations, $\tilde{u} = \boldsymbol{\delta}\psi + \boldsymbol{\epsilon}\phi$. Vector, $\boldsymbol{\lambda} = (0, 0, 1)$. **Do not expand the non-linear terms**.

[68 marks]

OPTIONAL. 5) Try to expand the non-linear terms, and get as far as you can.

[100 marks]

[Total: 80 OR 180 marks]

We will go through these in the next tutorial slot (I tutor you for).