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NPTEL

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Courses » Introduction to Finite Volume Methods II

Announcements **Course** Ask a Question Progress FAQ

Unit 9 - week 8 - Fluid Flow Computation and Some Advanced Topics

Register for Certification exam

Course outline

Assignment 8

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-03-27, 23:59 IST.

1) Which of the statement is true in the context of checkerboard problem *1 point*

- The problem arises due to decoupling between the pressure and velocity field
- This can be avoided if the different variables are stored at staggered locations
- Both of the above
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both of the above

2) In SIMPLE algorithm, pressure correction equation is solved to satisfy *1 point*

- Continuity equation
- Momentum equation
- Energy equation
- All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Continuity equation

3) The SIMPLE algorithm on staggered grid solves *1 point*

- first pressure correction equation and then momentum equation
- first momentum equation and then pressure correction equation
- both pressure correction and momentum equation simultaneously

4) Disadvantages of using the staggered grid is *1 point*

- large number of staggered grids are required with the velocity components integrated over different elements in 2D or 3D
- Large amount of memory requirement to store velocity, pressure and other variables
- It becomes complex for non-cartesian grids and unstructured grids
- All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

5) At a stationary wall for incompressible flow, boundary conditions for velocity ($\vec{V}_b$) and pressure (p) are *1 point*

- $\vec{V}_b = 0$
- $\frac{\partial \vec{V}_b}{\partial n} = 0$ where n means the distance locally normal to the wall
- p = 0
- $\frac{\partial p}{\partial n} = 0$ where n means the distance locally normal to the wall

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\vec{V}_b = 0$
$\frac{\partial p}{\partial n} = 0$ *where n means the distance locally normal to the wall*

6) Which statement is true for PISO algorithm *1 point*

- One or more PRIME steps are applied in the first step to account for $\boldsymbol{H}_c[\boldsymbol{v}']$
- The second step is similar to SIMPLE algorithm
- Both of the above
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
None of the above

7) The smallest turbulent eddies are characterized by the Kolmogorov micro length (η) given by *1 point*

- $\eta = (\frac{\nu^3}{\epsilon})^{\frac{1}{4}}$
- $\eta = (\frac{\nu}{\epsilon^3})^{\frac{1}{4}}$
- $\eta = (\frac{\nu^3}{\epsilon})^{\frac{1}{2}}$
-

$\eta = (\frac{\nu}{\epsilon^3})^{\frac{1}{2}}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\eta = (\frac{\nu^3}{\epsilon})^{\frac{1}{4}}$

8) Boussinesq hypothesis models Reynolds stress ***1 point***

- directly proportional to the mean velocity gradient
- proportional to the square of mean velocity gradient
- proportional to the inverse of mean velocity gradient
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
directly proportional to the mean velocity gradient

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