MITx CSE.0002x
Introduction to Computational Science and Engineering

Help   sandipan_dey

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3.5.5 Finger Exercise: Explicit or Implicit?

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Discussions

Finger Exercises 3 due Aug 17, 2023 05:00 IST   Completed

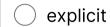# Problem: Determine whether a method is explicit or implicit
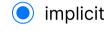
4/4 points (graded)

MO2.7

Consider the following method:

$$\underline{v}^{n+1} = \underline{v}^n + \frac{1}{2}\Delta t \left[\underline{f}(\underline{v}^{n+1}, t^{n+1}) + \underline{f}(\underline{v}^n, t^n) \right] \qquad (3.28)$$

Is this method explicit or implicit?

- ○ explicit

- ● implicit

✔

Consider the following method:

$$\underline{v}^{n+1} = \underline{v}^{n-1} + 2\Delta t \underline{f}(\underline{v}^n, t^n) \qquad (3.29)$$

Is this method explicit or implicit?

- ● explicit

- ○ implicit

✔

Consider the following method:

$$\underline{v}^{n+1} = \frac{4}{3}\underline{v}^n - \frac{1}{3}\underline{v}^{n-1} + \frac{2}{3}\Delta t \underline{f}(\underline{v}^{n+1}, t^{n+1}) \qquad (3.30)$$

Is this method explicit or implicit?

- ○ explicit

- ● implicit

✔

Consider the following method:

$$\underline{a} = \Delta t \underline{f}(\underline{v}^n, t^n) \qquad (3.31)$$

$$\underline{b} = \Delta t \underline{f}(\underline{v}^n + \underline{a}/2, t^n + \Delta t/2)$$

$$\underline{v}^{n+1} = \underline{v}^n + \underline{b}$$

Is this method explicit or implicit?

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SOLUTION: The solution will be available shortly after the due date