Assignment 6

Due on 2019-04-11, 23:59 EST.

The due date for submitting this assignment has passed.

1. For the differential equation $y'' - 4y = 0$ with basis function $y_1 = e^{2x}$ and $y_2 = e^{-2x}$, the general solution is given by $y = A e^{2x} + B e^{-2x}$.

2. In the $3D$-ODE, the first derivative of left and right Laplace basis functions, $u_1(x)$ and $u_2(x)$, in the segment $x < x_1$, are given by $k(x_0) = f(x_0)$ and $k(x_1) = 0$.

3. Consider the heat transfer function defined by the operator below:

   $$\frac{\partial u}{\partial t} = \alpha \nabla^2 u$$

   The value of the function at point $(x_0, y_0)$ is given by...

   $u(x_0, y_0) = u_{(x_0, y_0)}$.

   Accepted Answers:

   0.

4. The expression for Dirichlet boundary condition is given by...

   $D(x_0, y_0) = \phi(x_0, y_0)$.

   Accepted Answers:

   0.

5. The expression for Neumann boundary condition is given by...

   $\alpha \frac{\partial u}{\partial n} = 

   Accepted Answers:

   0.

6. The expression for Robin boundary condition is given by...

   $\alpha \frac{\partial u}{\partial n} - u(x_0, y_0) = \phi(x_0, y_0)$.

   Accepted Answers:

   0.

7. What is the final term of the system matrix obtained after assembling the elements in $3D$-FDI?

   $\alpha$, $\nabla^2 u$, $k(x_0, y_0)$.

   Accepted Answers:

   0.

8. Statement A: FEM is more computationally efficient than the finite difference method.

   Statement B: FEM is more computationally efficient than the finite difference method.

   Both statements are correct and Statement A is the correct reason for Statement B.

   Both statements are correct but Statement B is the correct reason for Statement A.

   Both statements are correct.

   Statement A is correct.

   Both statements are correct and Statement B is correct.

   Accepted Answers:

   0.

9. What is the computational complexity of solving the $3D$-FDI system of equations?

   $O(n^2)$.

   Accepted Answers:

   0.

10. Evaluate $\nabla^2 u$ at any point $x_0, y_0$.

    $\alpha \frac{\partial u}{\partial n}$.

    Accepted Answers:

    0.