

Pregunta 1

No s'ha respost encara

Puntuat sobre 10,00

Let us consider the domain Ω , meshed by means of two elements (a quadrilateral and a triangle) as follows.

Nodes: $(0, 0)$, $(2, 0)$, $(5, 0)$, $(0, 1)$, $(2, 1)$.

Connectivity matrix: $\begin{pmatrix} 1 & 2 & 5 & 4 \\ 5 & 2 & 3 & * \end{pmatrix}$.

Using this mesh, we are going to consider the finite element method for the following problem:

$$\begin{cases} -k_c \Delta u = f & \text{on } \Omega, \\ u(x, 0) = 3x, \\ u(0, y) = 2y, \\ \frac{\partial u}{\partial y}(x, y) = 2, & \text{on the line joining nodes 4 and 5.} \\ \frac{\partial u}{\partial n}(x, y) = 0, & \text{on the line joining nodes 3 and 5.} \end{cases}$$

where $k_c = 12$ and $f \equiv 2$ on Ω^1 , $k_c = 6$ and $f \equiv 4$ on Ω^2 .

(a) (2 points) What is the value of $\psi_2^1(0.5, 0.5)$?

- ☐ 3/16
- ☐ 5/36
- ☐ Leave it empty (no penalty)
- ☐ 3/8
- ☐ 1/8

(b) (2 points) Let $[K]$ be the assembled matrix of the system. What is the value of $K(5, 2)$?

Hint: You don't need the full $[K]$ matrix. On the other hand, the manual assembly of a rectangle and a triangle is done the same way of the assembly of two triangles.

- ☐ Leave it empty (no penalty)
- ☐ $-13/4$
- ☐ -1
- ☐ $-3/2$
- ☐ -16

(c) (2 points) Let F be the assembled force vector of the system. $[K]U = F + Q$, what is the value of $F(5)$?

- ☐ 4
- ☐ Leave it empty (no penalty)
- ☐ 2
- ☐ 3
- ☐ 5

(d) (2 points) What is the value of $Q_{ij}^k = Q_{33}^1$?

- ☐ 18
- ☐ 12
- ☐ 36

☐ 24

☐ Leave it empty (no penalty)

(e) (2 points) What is the value of U_5 , the approximated solution at node 5?

☐ 12.78

☐ Leave it empty (no penalty)

☐ 7.28

☐ 6.26

☐ 3.69

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Comportament que s'està utilitzant: Retroalimentació diferida

Fracció mínima: -0.25

Fracció màxima: 1

Variant de pregunta: 1

Resum de la pregunta: Let us consider the domain Ω , meshed by means of two elements (a quadrilateral and a triangle) as follows. Nodes: $(0,0), (2,0), (5,0), (0,1), (2,1)$. Connectivity matrix: $\begin{bmatrix} 1 & 2 & 5 & 4 \\ 5 & 2 & 3 & 8 \end{bmatrix}$. Using this mesh, we are going to consider the finite element method for the following problem: $-\Delta u = f$ on Ω , $u(x,0) = 3x$, $u(0,y) = 2y$, $\frac{\partial u}{\partial n}(x,y) = 2$, $\frac{\partial u}{\partial n}(x,y) = 0$, on the line joining nodes 4 and 5. $\frac{\partial u}{\partial n}(x,y) = 0$, on the line joining nodes 3 and 5. where $k_c = 12$ and $k_c = 6$ and $k_c = 4$ on Ω . (a) (2 points) What is the value of $\psi_1(0.5, 0.5)$? $\{3/16; 5/36; \text{Leave it empty (no penalty)}; 3/8; 1/8\}$ (b) (2 points) Let $[K]$ be the assembled matrix of the system. What is the value of $K(5,2)$? $\text{Hint: You don't need the full } [K] \text{ matrix. On the other hand, the manual assembly of a rectangle and a triangle is done the same way of the assembly of two triangles. } \{-13/4; -1; -3/2; -16\}$ (c) (2 points) Let $[F]$ be the assembled force vector of the system. $[K]U = F + Q$, what is the value of $F(5)$? $\{4; \text{Leave it empty (no penalty)}; 2; 3; 5\}$ (d) (2 points) What is the value of $Q^k_{ij} = Q^k_{33}$? $\{18; 12; 36; 24; \text{Leave it empty (no penalty)}\}$ (e) (2 points) What is the value of U_5 , the approximated solution at node 5? $\{12.78; \text{Leave it empty (no penalty)}; 7.28; 6.26; 3.69\}$

Resum de la resposta correcta: part 1: $1/8$; part 2: -16 ; part 3: 3; part 4: 24; part 5: 6.26

Resum de respostes:

Estat de la pregunta: todo

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Opcions de l'intent

Com es comporten les preguntes



Retroalimentació diferida

Puntuat sobre

10

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Opcions de visualització

Si és correcta

Mostrat

Puntuacions

Mostra la puntuació i el màxim

Xifres decimals en les puntuacions

2

Retroacció específica

Mostrat

Retroacció general

Mostrat

Resposta correcta

Mostrat

Historial de les respostes

No es mostra

Actualitza les opcions de visualització