

Pregunta 1

Correcte

Puntuació 10,00 sobre 10,00

Given the BVP problem, made up by the linear, second order differential equation $-\frac{d}{dx}\left(\cos(x)\frac{du}{dx}\right) + 6u = -50$, $x \in (0, 1)$, and the BC $\frac{du}{dx}(0) + \alpha u(0) = -\frac{1}{2}$, $\frac{du}{dx}(1) = 2.5$, consider its FEM solution using a mesh of $N = 100$ linear elements numbered from left to right in ascending order, in such a way that the first node is placed at $x_1 = 0$, and the last node is placed at $x_{N+1} = 1$.

If we denote by u_i , $i = 1, \dots, N + 1$, the nodal solution given by the FEM:

(a) (4 points) For $\alpha = 0$, compute the $\min_i u_i$.

- ☐ -8.5545e+00
- ☐ -7.7130e+00
- ☐ -7.9568e+00
- ☒ -8.1235e+00 ✓
- ☐ Leave it empty (no penalty)

Puntuació 4,00 sobre 4,00

La resposta correcta és: -8.1235e+00

Hint. For the first element $K_{1,1}^1 = 1.0002e + 02$ and $u_{10} = -8.0782e + 00$

(b) (3 points) The interpolated value of u at $x = \pi/6$ is

- ☐ -8.0879e+00
- ☐ -8.0006e+00
- ☐ -8.1217e+00
- ☒ -8.1021e+00 ✓
- ☐ Leave it empty (no penalty)

Puntuació 3,00 sobre 3,00

La resposta correcta és: -8.1021e+00

(c) (3 points) For $\alpha = 1$ the averaged value of the nodal solution, $\langle u \rangle := \frac{\sum_{i=1}^{N+1} u_i}{N + 1}$, is

- ☐ -1.1994e+01
- ☐ -6.2166e+00
- ☒ -1.0344e+01 ✓
- ☐ Leave it empty (no penalty)
- ☐ -1.3095e+01

Puntuació 3,00 sobre 3,00

La resposta correcta és: -1.0344e+01

Hint1. For this value of α , $u_{10} = -1.2787e+01$

Hint2. With this BC, the final system of the previous section changes very little.

Torna a començar

Desa

Emplena amb les respostes correctes

Envia i acaba

Tanca la previsualització