2016 1190 이민재

■ 8-2-a

$b'' = b^2 \sin b \qquad b'(0) = 0 \qquad b(\pi) = 1$

$\hookrightarrow \dfrac{b_2 - b_0}{2h} = 0 \qquad b_2 = b_0$

$\begin{cases} i=1 & -2b_1 + 2b_2 - h^2 b_1^2 \sin b_1 = 0 \\ i = 2 \sim n-1 & b_{i-1} - 2b_i + b_{i+1} - h^2 b_i^2 \sin b_i = 0 \\ i = n & b_n = 0 \end{cases} \Rightarrow$ using matLab

■ 8-2-b

$b'' = -2b(2xb' + b) \qquad b(0) = \tfrac{1}{2} \qquad b'(1) = -\tfrac{2}{9}$

$\begin{cases} b_1 = 0.5 \\ b_{i-1} - 2b_i + b_{i+1} + 2b_i(2x_i b_i' + b_i)h^2 = 0 \\ b_{n-1} - 2b_n + (b_{n+1} - \tfrac{4}{9}h) + 2b_n(2x_n(\tfrac{2}{9}) + b_n)h^2 = 0 \end{cases}$

$\boxed{\dfrac{b_{n+1} - b_{n-1}}{2h} = -\dfrac{9}{2} \\ b_{n+1} = b_{n-1} - \dfrac{4}{9}h}$

$\Rightarrow$ using matLab

■ 8-2-18

think $\quad x = \dfrac{r}{\omega} \qquad x start = 0.5 \qquad x stop = 1 \qquad \dfrac{d^2 T}{dr^2} = -\dfrac{1}{x}\dfrac{dT}{dr}$

$T(0.5) = 0$
$T(1) = 200$

$T_1 \neq$

$\begin{cases} = 0 & i=1 \\ T_{i-1} - 2T_i + T_{i+1} - h^2(-\tfrac{1}{x_i} \times \dfrac{T_{i+1} - T_{i-1}}{2h}) = 0 & i = 2 \sim n-1 \\ T_n = 200 & i = n. \end{cases}$

$\hookrightarrow$ using LU dec, matlab

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2-2-9 →

using matLab   X = 2,4014
2,6077
2,5288
2,5015
2,5011
2,4971
2,4873
2,4514
2,3205
1,8301

2-2-20   using matLab

X = 19,7222
19,4444
18,3333
17,0000
16,0000

8-2-6

$b'' = xb$, $b(1) = 1,5$ $b(2) = 3$

$$b'' = \frac{b_{i-1} - 2b_i + b_{i+1}}{h^2}$$

→ $b_1 + 0 + \cdots \qquad + 0 = 1,5$

$\{ b_{i-1} - 2b_i + b_{i+1} - h^2 x_i b_i = 0 \}$ Tridiagonal Coefficient Matrix

$0 + \cdots \qquad + b_n = 3$

⇒ Using matlab

8-2-8

$x^2 b'' + x b' + b = 0$, $b(1) = 0$, $b(2) = 0,638961$.

$$b'' = -\frac{1}{x} b' - \frac{b}{x^2}$$

$b_1 + 0 + \cdots \qquad \qquad + 0 = 0$

$\left\{ b_{i-1} - 2b_i + b_i - h^2 \left(-\frac{b_{i+1} - b_{i-1}}{2hx_i} - \frac{b_i}{x_i^2} \right) = 0 \right.$

$0 + \cdots \qquad \qquad + b_n = 0,638961$

⇒ Using matlab