

$$\begin{aligned} \text{when } i=3, j=6 &= U_{3,6} = 0.5(U_{2,6}) + 0.5(U_{4,6}) \\ &= 0.5(0.0024) + 0.5(0.0024) \\ &= U_{3,6} = 0.0024 \end{aligned}$$

$$\begin{aligned} \text{when } i=4, j=0 &= U_{4,0} = 0.5(U_{3,0}) + 0.5(U_{5,0}) \\ &= 0.5(0.0024) + 0.5(0.0024) \\ &= U_{4,0} = 0.0024 \end{aligned}$$

for $j=1$

$$\begin{aligned} \text{when } i=1, j=2 &= U_{1,2} = 0.5(U_{0,1}) + 0.5(U_{2,1}) \\ &= 0.5(U_{1,1}) + 0.5(U_{1,1}) = 0.5(0.0056) \\ U_{1,2} &= 0.0028 \end{aligned}$$

$$\begin{aligned} \text{when } i=2, j=2 &= U_{2,2} = 0.5(U_{1,2}) + 0.5(U_{3,1}) \\ &= 0.0028 \end{aligned}$$

$$\begin{aligned} \text{when } i=3, j=2 &= U_{3,2} = 0.5(U_{2,2}) + 0.5(U_{4,1}) \\ &= 0.5(0.0028) + 0.5(0.0048) \\ &= 0.0038 \end{aligned}$$

$$\begin{aligned} \text{when } i=4, j=2 &= U_{4,2} = 0.5(U_{3,1}) + 0.5(U_{5,1}) \\ U_{4,2} &= 0.0038 \end{aligned}$$

for $j=2$

$$\begin{aligned} \text{when } i=1 &= U_{1,3} = 0.5(U_{0,2}) + 0.5(U_{2,2}) \\ &= 0.0038 \end{aligned}$$

$$\begin{aligned} \text{when } i=2 &= U_{2,3} = 0.5(U_{1,2}) + 0.5(U_{3,2}) \\ &= 0.004 \end{aligned}$$

$$\begin{aligned} \text{when } i=3 &= U_{3,3} = 0.5(U_{2,2}) + 0.5(U_{4,2}) \\ &= 0.5(0.0028) + 0.5(0.0038) = 0.0033 \end{aligned}$$

$$\text{when } i=4 &= U_{4,3} = 0.5(U_{3,2}) + 0.5(U_{5,2})$$

$$U_{4,3} = \cancel{0.0038} \quad 0.0036$$

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U₀ = 0.5 u₀₀

$$\frac{d^2 u}{dx^2} = 0$$

$$\frac{du}{dx} = C_1$$

$$u = \frac{C_1 x}{1}$$

$$U_{x=1} = U_1 = C_1(1) = C_1$$

$$U_{x=0} = U_0 = C_1(0) = 0$$

$$U_{x=1} = U_1 = C_1(1) = C_1$$

$$U_{x=0} = U_0 = C_1(0) = 0$$

$$U(x_0) = x^2$$

$$\Delta x = 0.2, \Delta t = 0.025$$

for limited condition

$$\Delta t = 0 \rightarrow 0^2 = 0$$

$$\Delta t = 0.2 \rightarrow 0.2^2 = 0.04$$

$$\Delta t = 0.4 \rightarrow 0.4^2 = 0.16$$

$$\Delta t = 0.6 \rightarrow 0.6^2 = 0.36$$

$$\Delta t = 0.8 \rightarrow 0.8^2 = 0.64$$

$$\Delta t = 1 \rightarrow 1^2 = 1$$

$$U_{ij} = U_j + r [U_{i+1,j} - 2U_{i,j} + U_{i-1,j}]$$

$$U_{j,t} = r [U_{i+1,t} + (1-2)U_{i,t} + U_{i-1,t}]$$

when $i = j = 0$

$$U_{0,t} = 0.5 U_{0,t} + 0.5 U_{1,t}$$

$$= 0.5(0) + 0.5(0.025)$$

$$U_{0,t} = 0.0125$$

when $i = 2, j = 0$

$$U_{2,t} = 0.5(U_{1,t}) + 0.5(U_{3,t})$$

$$= 0.5(0.025) + 0.5(0.1276)$$

for $J=2$

$$\text{when } i=1 \quad V_{2,1} = 0.5 (U_{2,2}) + 0.5 (U_{2,0}) \\ = 0.084$$

$$\text{when } i=2 \quad V_{2,2} = 0.5 (U_{2,3}) + 0.5 (U_{2,1}) \\ = 0.2078$$

$$\text{when } i=3 \quad V_{2,3} = 0.5 (0.114) + 0.5 (0.457) \\ = 0.2855$$

$$\text{when } i=4 \quad V_{2,4} = 0.5 (U_{2,3}) + 0.5 (U_{2,2}) \\ = 0.281$$

for $J=4$

$$\text{when } i=1 \quad U_{4,1} = 0.5 (U_{4,2}) + 0.5 (U_{4,0}) \\ = 0.5 (0.2078) = 0.1039$$

$$\text{when } i=2 \quad U_{4,2} = 0.5 (U_{4,3}) + 0.5 (U_{4,1}) \\ = 0.5 (0.087) + 0.5 (0.1039) \\ = 0.20145$$

$$\text{when } i=3 \quad U_{4,3} = 0.5 (U_{4,4}) + 0.5 (U_{4,2}) \\ = 0.5 (0.2078) + 0.5 (0.1039) \\ = 0.15585$$

$$\text{when } i=4 \quad U_{4,4} = 0.5 (U_{4,3}) + 0.5 (U_{4,3}) \\ = 0.5 (0.15585) + 0.5 (0.15585) \\ = 0.15585$$

$\frac{dx}{dt}$	$\frac{dy}{dt}$						
0.1	5	0	0.1000	0.0000	0.0000	0.0000	1
0.05	4	0	0.0500	0.0000	0.0000	0.0000	1
0.06	3	0	0.0500	0.0000	0.0000	0.0000	1
0.07	2	0	0.0500	0.0000	0.0000	0.0000	1
0.08	1	0	0.0500	0.0000	0.0000	0.0000	1
0	0	0	0.0000	0.0000	0.0000	0.0000	1
Ans		0	0.2	0.4	0.6	0.8	1
		1	0	1	2	3	4
							5

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