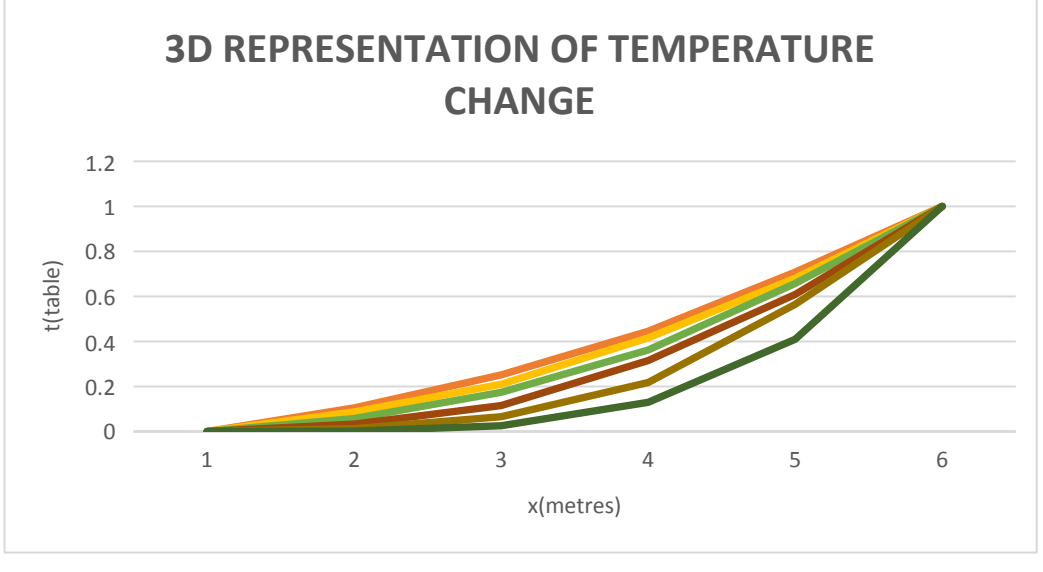
0.5

0.1	0	0.1049	0.2514	0.4454	0.7079	1
0.08	0	0.087	0.2098	0.4158	0.681	1
0.06	0	0.0576	0.174	0.362	0.6576	1
0.04	0	0.0328	0.1152	0.3152	0.6088	1
0.02	0	0.0128	0.0656	0.2176	0.5648	1
0	0	0.0016	0.0256	0.1296	0.4096	1
	0	0.2	0.4	0.6	0.8	1



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$U_t - C U_{xx} = 0$

$\frac{du}{dt} - C\frac{d^2u}{dx^2} = 0$

$\frac{du}{dt} = C\frac{d^2u}{dx^2}$

$\frac{U_{i,j+1} - U_{i,j}}{\Delta t} = c\,\frac{U_{i+1,j} - 2U_{i,j} + U_{i-1,j}}{\Delta x^2}$

$U_{i,j} - U_{i,j} = C\frac{\Delta t}{\Delta x^2}[U_{i+1,j} - 2U_{i,j} + U_{i-1,j}]$ $\Delta t/\Delta x^2, C = r$

$U(x,0) = x^4 K$

$\Delta x = 0.2m$, $\Delta t = 0.02$ day

For limited conditions

At $x=0 \rightarrow x^4 = 0$

At $x = 0.2 \rightarrow 0.2^4 = 1.6 \times 10^{-3}$

At $x = 0.4 \rightarrow 0.4^4 = 0.0256$

At $x = 0.6 \rightarrow 0.6^4 = 0.1296$

At $x = 0.8 \rightarrow 0.8^4 = 0.4096$

At $x = 1 \rightarrow 1^4 = 1$

$\therefore U_{i,j+1} = U_{i,j} + r(U_{i+1,j} - 2U_{i,j} + U_{i-1,j})$

$U_{i,j+1} = [U_{i-1,j} + (1-2r)U_{i,j} + rU_{i+1,j}$ ← 4

when $i=1, j=0$

$U_{i,1} = 0.5\,U_{0,0} + 0.5\,U_{2,0}$.

$= 0.5(0) + 0.5(0.0256)$

$U_{1,1} = 0.0128$.

when $i=2, j=0$

$U_{2,i} = 0.5(U_{1,0}) + 0.5(U_{0,0})$

$= 0.5(1.6\times10^{-3}) + 0.5(0.1296)$

$U_{2,1} = 0.0656$.

when $i=3, j=0$ $\therefore U_{3,1} = 0.5(U_{2,0}) + 0.5(U_{4,0})$

$= 0.5(0.0256) + 0.5(0.4096)$

$U_{3,1} = 0.2176.$

when $i=4, j=0$ $U_{4,1} = 0.5(U_{3,0}) + 0.5(U_{5,0})$

$= 0.5(0.0256) + 0.5(0.4096)$

$U_{4,1} = 0.5648.$

For $j=1$

when $i=1$ $\therefore U_{1,2} = 0.5(0,1) + 0.5\,U_{0,1})$

$= 0.5(U_{0,1} + 0.5\,U_{0,1} = 0 + 0.5(0.0656)$

$U_{1,2} = 0.0328$

when $i=2$ $\therefore U_{2,2} = 0.5(U_{1,1}) + 0.5(U_{3,1})$

$= 0.5(0.0128) + 0.5(0.2176)$

$U_{2,2} = 0.1152.$

when $i=3$ $U_{3,2} = 0.5(U_{0,1}) + 0.5(U_{4,1})$

$= 0.5(0.0656) + 0.5(0.5648)$

$U_{3,2} = 0.3152.$

when $i=4$ $\therefore U_{4,2} = 0.5(U_{0,1}) + 0.5(U_{5,1})$

$= 0.5(0.2176) + 0.5(1)$

$U_{4,2} = 0.6088.$

For $j=2$

when $i=1$ $\therefore U_{1,3} = 0.5(U_{0,1}) + 0.5(U_{2,2})$

$= 0 + 0.5(0.1152) = 0.0576$

when $i=2$ $\therefore U_{0,3} = 0.5(U_{1,2}) + 0.5(U_{3,2})$

$= 0.5(0.0328) + 0.5(0.3152) = 0.174$

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

$= 0.5(0.1152) + 0.5(0.6088) = 0.362$

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

$= 0.5(0.3152) + 0.5(1)$

$= 0.6576.$

For $j=3$

when $i=1$ $U_{1,4} = 0.5(U_{0,3}) + 0.5(U_{0,3})$

$= 0.5(0) + 0.5(0.174) = 0.084$

when $i=2$ $u_{2,4} = 0.5(u_{1,3}) + 0.5(u_{3,3})$

$= 0.5(0.0576) + 0.5(0.362) = 0.2098$

when $i=3$ $u_{3,4} = 0.5(u_{2,3}) + 0.5(u_{4,3})$

$= 0.5(0.174) + 0.5(0.6576) = 0.4158$

when $i=4$ $u_{4,4} = 0.5(u_{3,3}) + 0.5(u_{5,3})$

$= 0.5(0.362) + 0.5(1)$

$= 0.681$

for $j=4$

when $i=1$ $u_{1,5} = 0.5(u_{0,4}) + 0.5(u_{2,4})$

$= 0.5(0.2098) = 0.1099$

when $i=2$ $u_{2,5} = 0.5(u_{1,4}) + 0.5(u_{3,4})$

$= 0.5(0.087) + 0.5(0.4158) = 0.2514$

when $i=3$ $u_{3,5} = 0.5(u_{2,4}) + 0.5(u_{4,4})$

$= 0.5(0.2098) + 0.5(0.681)$

$= 0.4459.$

when $i=4$ $u_{4,5} = 0.5(u_{3,4}) + 0.5(u_{5,4})$

$= 0.5(0.4158) + 0.5(1)$

$= 0.7079$

$\Delta\theta$	I / Temp(K)						
0.1	5	0	0.1049	0.2514	0.4459	0.7079	1
0.08	4	0	0.087	0.2098	0.4158	0.681	1
0.06	3	0	0.576	0.174	0.362	0.6576	1
0.04	2	0	0.0328	0.1152	0.3152	0.6008	1
0.02	1	0	0.0128	0.0656	0.2176	0.5648	1
0	0	0	0.0016	0.028	0.1296	0.4096	1
Δx		0	0.2	0.4	0.6	0.8	1
	i	0	1	2	3	4	5