

1.

Finite-difference solution (h = k = 0.10π ≈ 0.314)

| y\x | 0.00π | 0.10π | 0.20π | 0.30π | 0.40π | 0.50π | 0.60π | 0.70π | 0.80π | 0.90π | 1.00π |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0.00π | 1.0000 | 0.9511 | 0.8090 | 0.5878 | 0.3090 | 0.0000 | -0.3090 | -0.5878 | -0.8090 | -0.9511 | -1.0000 |
| 0.10π | 0.9511 | 0.7532 | 0.5559 | 0.3332 | 0.0858 | -0.1732 | -0.4243 | -0.6452 | -0.8145 | -0.9158 | -0.9511 |
| 0.20π | 0.8090 | 0.5646 | 0.3476 | 0.1326 | -0.0869 | -0.3056 | -0.5112 | -0.6862 | -0.8099 | -0.8589 | -0.8090 |
| 0.30π | 0.5878 | 0.3681 | 0.1763 | -0.0050 | -0.1823 | -0.3539 | -0.5116 | -0.6420 | -0.7244 | -0.7255 | -0.5878 |
| 0.40π | 0.3090 | 0.1728 | 0.0531 | -0.0589 | -0.1667 | -0.2699 | -0.3642 | -0.4413 | -0.4863 | -0.4679 | -0.3090 |
| 0.50π | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | -0.0000 |

2.

Temperature profile at t = 10 s

| r | Forward(dt=0.01) | Backward(dt=0.5) | Crank-Nicolson |
|------|------------------|------------------|----------------|
| 0.50 | 230.66 | 202.37 | 216.14 |
| 0.60 | 299.85 | 263.09 | 280.98 |
| 0.70 | 358.97 | 322.63 | 340.01 |
| 0.80 | 410.87 | 377.82 | 393.60 |
| 0.90 | 457.45 | 429.98 | 444.09 |
| 1.00 | 500.00 | 500.00 | 500.00 |

3.

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Converged in 2898 iterations (max Δ = 9.96e-07)
\nθ = π/6 (約 30°) 截面温度：
r = 0.50    T ≈    50.00
r = 0.51    T ≈    49.85
r = 0.53    T ≈    49.73
r = 0.54    T ≈    49.66
r = 0.55    T ≈    49.64
r = 0.56    T ≈    49.70
r = 0.57    T ≈    49.84
r = 0.59    T ≈    50.08
r = 0.60    T ≈    50.41
r = 0.61    T ≈    50.84
r = 0.62    T ≈    51.37
r = 0.64    T ≈    52.01
r = 0.65    T ≈    52.75
r = 0.66    T ≈    53.59
r = 0.68    T ≈    54.54
r = 0.69    T ≈    55.58
r = 0.70    T ≈    56.71
r = 0.71    T ≈    57.94
r = 0.72    T ≈    59.25
r = 0.74    T ≈    60.64
r = 0.75    T ≈    62.11
r = 0.76    T ≈    63.66
r = 0.78    T ≈    65.27
r = 0.79    T ≈    66.95
r = 0.80    T ≈    68.69
r = 0.81    T ≈    70.47
r = 0.82    T ≈    72.31

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r = 0.84    T ≈    74.18
r = 0.85    T ≈    76.10
r = 0.86    T ≈    78.04
r = 0.88    T ≈    80.01
r = 0.89    T ≈    82.00
r = 0.90    T ≈    84.01
r = 0.91    T ≈    86.02
r = 0.93    T ≈    88.04
r = 0.94    T ≈    90.06
r = 0.95    T ≈    92.07
r = 0.96    T ≈    94.08
r = 0.98    T ≈    96.07
r = 0.99    T ≈    98.05
r = 1.00    T ≈   100.00

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4.

[illegible]