1. $h=0.1$, $r=0.5$, $\tau=rh^2=0.005$;

$x_i=ih$, $0\le i\le 10$, $t_k=k\tau$, $0\le k\le 3$;

古典显格式为

$$\begin{cases} u_i^{k+1}=(1-2r)u_i^k+r(u_{i-1}^k+u_{i+1}^k) \\ \quad =0.5\times(u_{i-1}^k+u_{i+1}^k), \quad 1\le i\le 9,\ 0\le k\le 2 \\ u_i^0=\sin\pi x_i, \quad 1\le i\le 9, \\ u_0^k=0,\ u_{10}^k=0, \quad 0\le k\le 3 \end{cases}$$

计算得

| $u_i^k$ 的 $i$ \ $k$ | 0 | 1 | 2 | 3 |
|---|---|---|---|---|
| 1 | 0.3090170 | 0.2938927 | 0.2795089 | 0.2658284 |
| 2 | 0.5877853 | 0.5590170 | 0.5316568 | 0.5056357 |
| 3 | 0.8090170 | 0.7694209 | 0.7317268 | 0.6959478 |
| 4 | 0.9510565 | 0.9045085 | 0.8602387 | 0.8181357 |
| 5 | 1.0000000 | 0.9510565 | 0.9045085 | 0.8602387 |
| 6 | 0.9510565 | 0.9045085 | 0.8602387 | 0.8181357 |
| 7 | 0.8090170 | 0.7694209 | 0.7317268 | 0.6959478 |
| 8 | 0.5877853 | 0.5590170 | 0.5316568 | 0.5056357 |
| 9 | 0.3090170 | 0.2938927 | 0.2795089 | 0.2658284 |