第一题:

第1题

|  | t | Exact Value | Euler Value | Euler Relative Error | Taylor 2nd Value | \ |
|---|---|---|---|---|---|---|
| 0 | 1.000000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 | |
| 1 | 1.100000 | 0.105160 | 0.100000 | 0.049066 | 0.105000 | |
| 2 | 1.200000 | 0.221243 | 0.209917 | 0.051190 | 0.220919 | |
| 3 | 1.300000 | 0.349121 | 0.330471 | 0.053421 | 0.348612 | |
| 4 | 1.400000 | 0.489682 | 0.462354 | 0.055808 | 0.488954 | |
| 5 | 1.500000 | 0.643875 | 0.606285 | 0.058381 | 0.642883 | |
| 6 | 1.600000 | 0.812753 | 0.763041 | 0.061164 | 0.811438 | |
| 7 | 1.700000 | 0.997494 | 0.933475 | 0.064180 | 0.995787 | |
| 8 | 1.800000 | 1.199439 | 1.118537 | 0.067450 | 1.197252 | |
| 9 | 1.900000 | 1.420116 | 1.319293 | 0.070996 | 1.417344 | |
| 10 | 2.000000 | 1.661282 | 1.536943 | 0.074845 | 1.657795 | |

|  | Taylor 2nd Relative Error |
|---|---|
| 0 | 0.000000 |
| 1 | 0.001520 |
| 2 | 0.001463 |
| 3 | 0.001457 |
| 4 | 0.001486 |
| 5 | 0.001542 |
| 6 | 0.001617 |
| 7 | 0.001712 |
| 8 | 0.001823 |
| 9 | 0.001952 |
| 10 | 0.002099 |

第一题:

第二题:

第2题 h=0.1

| | t | u1 (Exact) | u1 (RK4) | u1 Relative Error | u2 (Exact) | \ |
|---|---|---|---|---|---|---|
| 0 | 0.000000 | 1.333333 | 1.333333 | 0.000000 | 0.666667 | |
| 1 | 0.100000 | 1.793063 | -3.052437 | 2.702359 | -1.032002 | |
| 2 | 0.200000 | 1.423902 | -23.847795 | 17.748195 | -0.874681 | |
| 3 | 0.300000 | 1.131577 | -130.165202 | 116.029960 | -0.724999 | |
| 4 | 0.400000 | 0.909409 | -680.231485 | 748.993250 | -0.608214 | |
| 5 | 0.500000 | 0.738788 | -3531.299585 | 4780.856145 | -0.515658 | |
| 6 | 0.600000 | 0.605710 | -18312.795052 | 30234.619544 | -0.440411 | |
| 7 | 0.700000 | 0.499860 | -94951.331907 | 189956.755587 | -0.377404 | |
| 8 | 0.800000 | 0.413671 | -492306.465639 | 1190091.431107 | -0.322954 | |
| 9 | 0.900000 | 0.341614 | -2552513.623867 | 7471916.734936 | -0.274409 | |
| 10 | 1.000000 | 0.279675 | -13234278.789168 | 47320223.642809 | -0.229888 | |
| 11 | 1.100000 | 0.224965 | -68617112.328350 | 305012334.184316 | -0.188082 | |

| | u2 (RK4) | u2 Relative Error |
|---|---|---|
| 0 | 0.666667 | 0.000000 |
| 1 | 8.989305 | 9.710546 |
| 2 | 51.192704 | 59.527283 |
| 3 | 269.269193 | 372.406517 |
| 4 | 1399.368584 | 2301.782465 |
| 5 | 7258.241839 | 14076.698288 |
| 6 | 37634.955483 | 85455.214395 |
| 7 | 195131.871735 | 517038.346525 |
| 8 | 1011721.872078 | 3132717.628867 |
| 9 | 5245578.826590 | 19115926.393205 |
| 10 | 27197287.206587 | 118306769.912275 |
| 11 | 141012541.218338 | 749740195.587569 |

第二题:

第二题:

第2题 h=0.05

| | t | u1 (Exact) | u1 (RK4) | u1 Relative Error | u2 (Exact) | u2 (RK4) | \ |
|---|---|---|---|---|---|---|---|
| 0 | 0.000000 | 1.333333 | 1.333333 | 0.000000 | 0.666667 | 0.666667 | |
| 1 | 0.050000 | 1.912059 | 1.721880 | 0.099463 | -0.909077 | -0.499599 | |
| 2 | 0.100000 | 1.793063 | 1.726915 | 0.036891 | -1.032002 | -0.832598 | |
| 3 | 0.150000 | 1.601967 | 1.617161 | 0.009485 | -0.961459 | -0.890373 | |
| 4 | 0.200000 | 1.423902 | 1.481687 | 0.040582 | -0.874681 | -0.861042 | |
| 5 | 0.250000 | 1.267646 | 1.348945 | 0.064134 | -0.795221 | -0.807505 | |
| 6 | 0.300000 | 1.131577 | 1.227063 | 0.084384 | -0.724999 | -0.750341 | |
| 7 | 0.350000 | 1.012999 | 1.117478 | 0.103139 | -0.663060 | -0.695886 | |
| 8 | 0.400000 | 0.909409 | 1.019525 | 0.121086 | -0.608214 | -0.645732 | |
| 9 | 0.450000 | 0.818630 | 0.931977 | 0.138460 | -0.559389 | -0.599934 | |
| 10 | 0.500000 | 0.738788 | 0.853541 | 0.155326 | -0.515658 | -0.558092 | |
| 11 | 0.550000 | 0.668275 | 0.783017 | 0.171700 | -0.476225 | -0.519706 | |
| 12 | 0.600000 | 0.605710 | 0.719337 | 0.187594 | -0.440411 | -0.484290 | |
| 13 | 0.650000 | 0.549909 | 0.661560 | 0.203035 | -0.407635 | -0.451407 | |
| 14 | 0.700000 | 0.499860 | 0.608868 | 0.218076 | -0.377404 | -0.420673 | |
| 15 | 0.750000 | 0.454695 | 0.560547 | 0.232798 | -0.349296 | -0.391754 | |
| 16 | 0.800000 | 0.413671 | 0.515980 | 0.247318 | -0.322954 | -0.364365 | |
| 17 | 0.850000 | 0.376158 | 0.474633 | 0.261791 | -0.298076 | -0.338259 | |
| 18 | 0.900000 | 0.341614 | 0.436043 | 0.276418 | -0.274409 | -0.313226 | |
| 19 | 0.950000 | 0.309583 | 0.399812 | 0.291454 | -0.251739 | -0.289089 | |
| 20 | 1.000000 | 0.279675 | 0.365600 | 0.307231 | -0.229888 | -0.265698 | |

| | u2 Relative Error |
|---|---|
| 0 | 0.000000 |
| 1 | 0.450432 |
| 2 | 0.193221 |
| 3 | 0.073935 |
| 4 | 0.015593 |
| 5 | 0.015447 |
| 6 | 0.034955 |
| 7 | 0.049507 |
| 8 | 0.061685 |
| 9 | 0.072481 |
| 10 | 0.082293 |
| 11 | 0.091305 |
| 12 | 0.099633 |
| 13 | 0.107380 |
| 14 | 0.114649 |
| 15 | 0.121555 |
| 16 | 0.128226 |
| 17 | 0.134806 |
| 18 | 0.141458 |
| 19 | 0.148370 |
| 20 | 0.155772 |

第二题: