

| ORIGINAL CODE |                |             |            |             |               |
|---------------|----------------|-------------|------------|-------------|---------------|
| nprocs        | Numerical      | Error       | N PROBLEM  | Time (s)    | SCALE         |
| 1             | 3.14159263198  | 1.09033E-07 | 100000000  | 2.196408129 | 1             |
| 2             | 3.141592636502 | 1.04511E-07 | 200000000  | 2.264001799 | 0.97014416246 |
| 4             | 3.141592638941 | 1.02072E-07 | 400000000  | 2.219219828 | 0.98972084756 |
| 8             | 3.141592640183 | 1.00829E-07 | 800000000  | 2.193324041 | 1.00140612482 |
| 16            | 3.141592640807 | 1.00205E-07 | 1600000000 | 3.253717375 | 0.67504576327 |

| MODIFIED CODE |                |             |            |             |               |
|---------------|----------------|-------------|------------|-------------|---------------|
| nprocs        | Numerical      | Error       | N PROBLEM  | Time (s)    | SCALE         |
| 1             | 3.14159263198  | 1.09033E-07 | 100000000  | 2.173199463 | 1             |
| 2             | 3.141592636502 | 1.04511E-07 | 200000000  | 2.241653585 | 0.96946266676 |
| 4             | 3.141592638941 | 1.02072E-07 | 400000000  | 2.223379803 | 0.97743060374 |
| 8             | 3.141592640183 | 1.00829E-07 | 800000000  | 2.201207829 | 0.9872759104  |
| 16            | 3.141592640807 | 1.00205E-07 | 1600000000 | 3.266618395 | 0.66527497253 |