

分散情報システム第8回課題

ソースコード

```
1  #include <stdio.h>
2  #include <stdlib.h>
3  #include <mpi.h>
4  #include <math.h>
5
6  #define F(x) (4.0L / (1.0L + x * x))
7
8  double pi(int n_intervals, int np, int my_rank);
9
10 int main(int argc, char **argv)
11 {
12     int n_intervals;
13     int np;
14     int my_rank;
15     int i;
16     double s, s_total;
17     MPI_Status status;
18
19     MPI_Init(&argc, &argv);
20     MPI_Comm_rank(MPI_COMM_WORLD, &my_rank);
21     MPI_Comm_size(MPI_COMM_WORLD, &np);
22
23     n_intervals = 10000000;
24
25     if (my_rank != 0) {
26         s = pi(n_intervals, np, my_rank);
27         MPI_Send(&s, 1, MPI_DOUBLE, 0, 1, MPI_COMM_WORLD);
28     }
29     else {
30         s_total = pi(n_intervals, np, my_rank);
31         for (i = 1; i < np; i++) {
32             MPI_Recv(&s, 1, MPI_DOUBLE, MPI_ANY_SOURCE, 1, MPI_COMM_WORLD, &status);
33             s_total += s;
34         }
35         printf("pi = %.30lf\n", s_total / n_intervals);
36     }
37     MPI_Finalize();
38 }
39
40 double pi(int n_intervals, int np, int my_rank)
41 {
42     int i, start, end;
```

```
43  double sum,step,x;
44
45  start = my_rank * (n_intervals / np);
46  end = (my_rank + 1) * (n_intervals / np);
47  step = 1.0L / n_intervals;
48  sum = 0.0L;
49  for (i = start;i < end;i++){
50      x = (i + 0.5L) * step;
51      sum += F(x);
52  }
53  return sum;
54 }
```
