



Technische
Universität
Braunschweig



Parallel Computing

Exercise 5

Andres Rodriguez, 4th June 2015

Homework 5 - Remember

✓ Deadline

10.05.2015 - 11:59:pm

✓ E-mail

Andres Rodriguez

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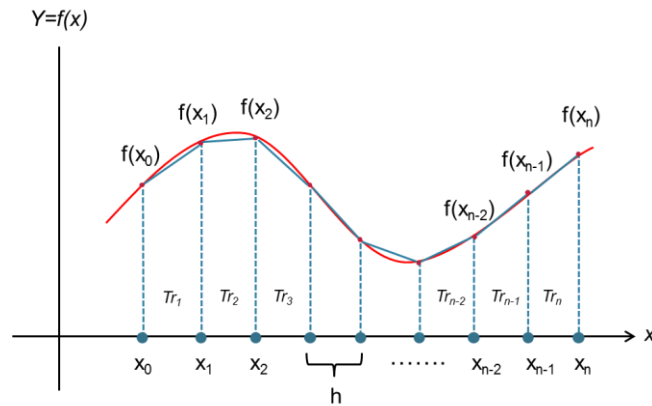
✓ Content

ZIP file including

- Source code
- Written report as *.pdf file

Definite Integral – MPI Reduce/Allreduce

Let's remember from the 2 Exercise Session using OpenMP

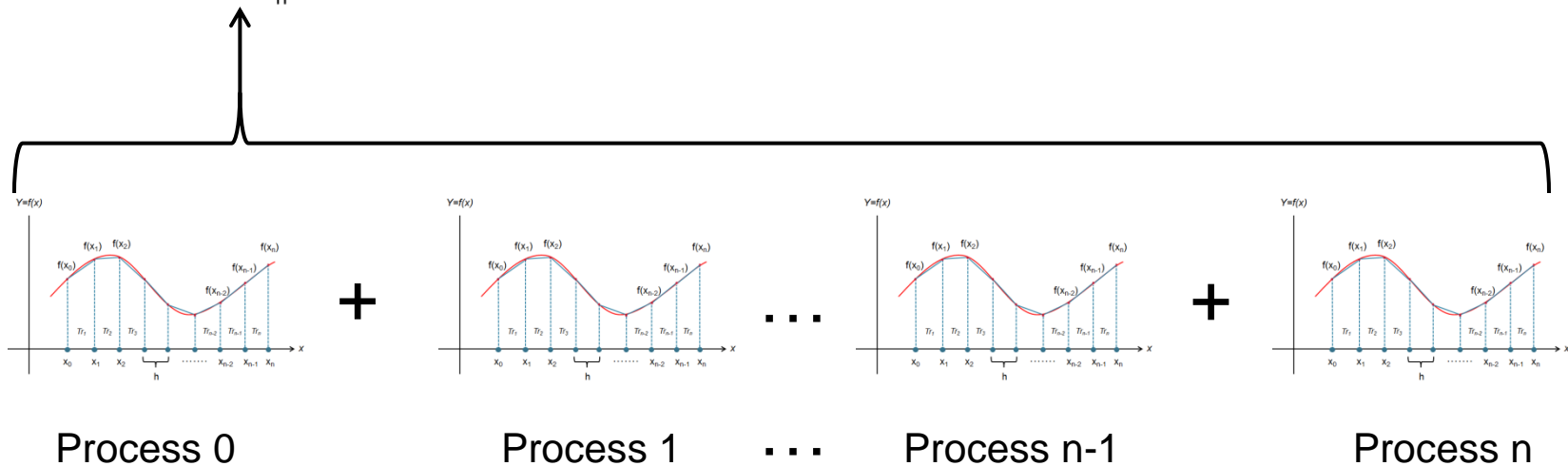


$$a = x_0$$

$$b = x_n$$

$$h = (b - a) / N$$

The *Global Result* requires a reduction operation



Definite Integral – MPI Reduce/Allreduce

Let's remember from the 2 Exercise Session using OpenMP

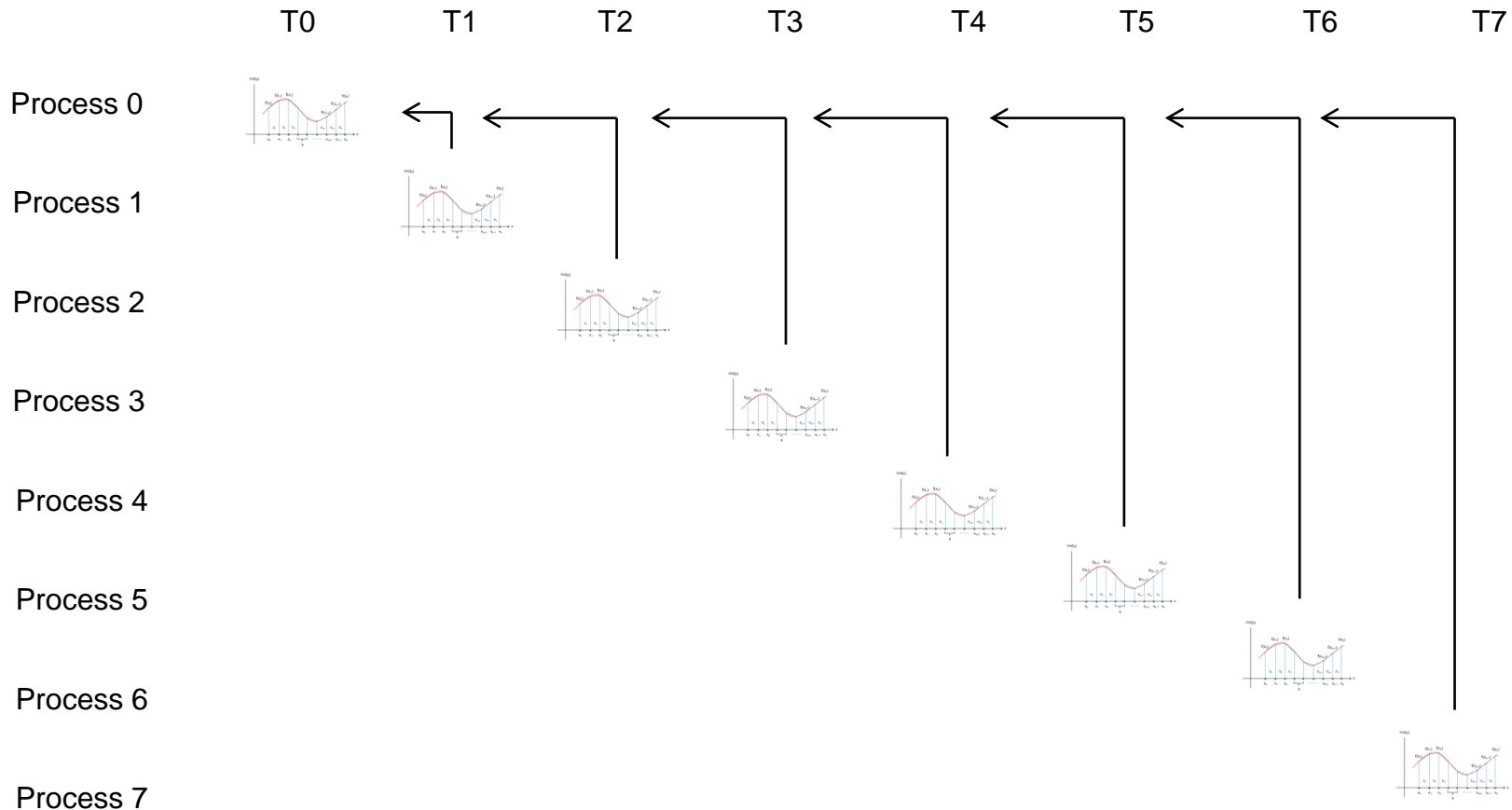
```
75
76
77     start = get_time();
78     //Run trapezoidal rule in thread_count number of threads
79 #pragma omp parallel num_threads(thread_count) reduction(+: global_result)
80 {
81     global_result += local_trap(a, b, n);
82 }
83 end = get_time();
84 elapsed_time = end - start;
85
```

Both of theses
analog forms
represent a naive
approach

```
75
76     start = get_time();
77     //Run trapezoidal rule in thread_count number of threads
78 #pragma omp parallel num_threads(thread_count)
79 {
80     double temp_result;
81
82     temp_result = local_trap(a, b, n);
83
84     #pragma omp critical
85     {
86         global_result += temp_result;
87     }
88 }
89 end = get_time();
90 elapsed_time = end - start;
91
```

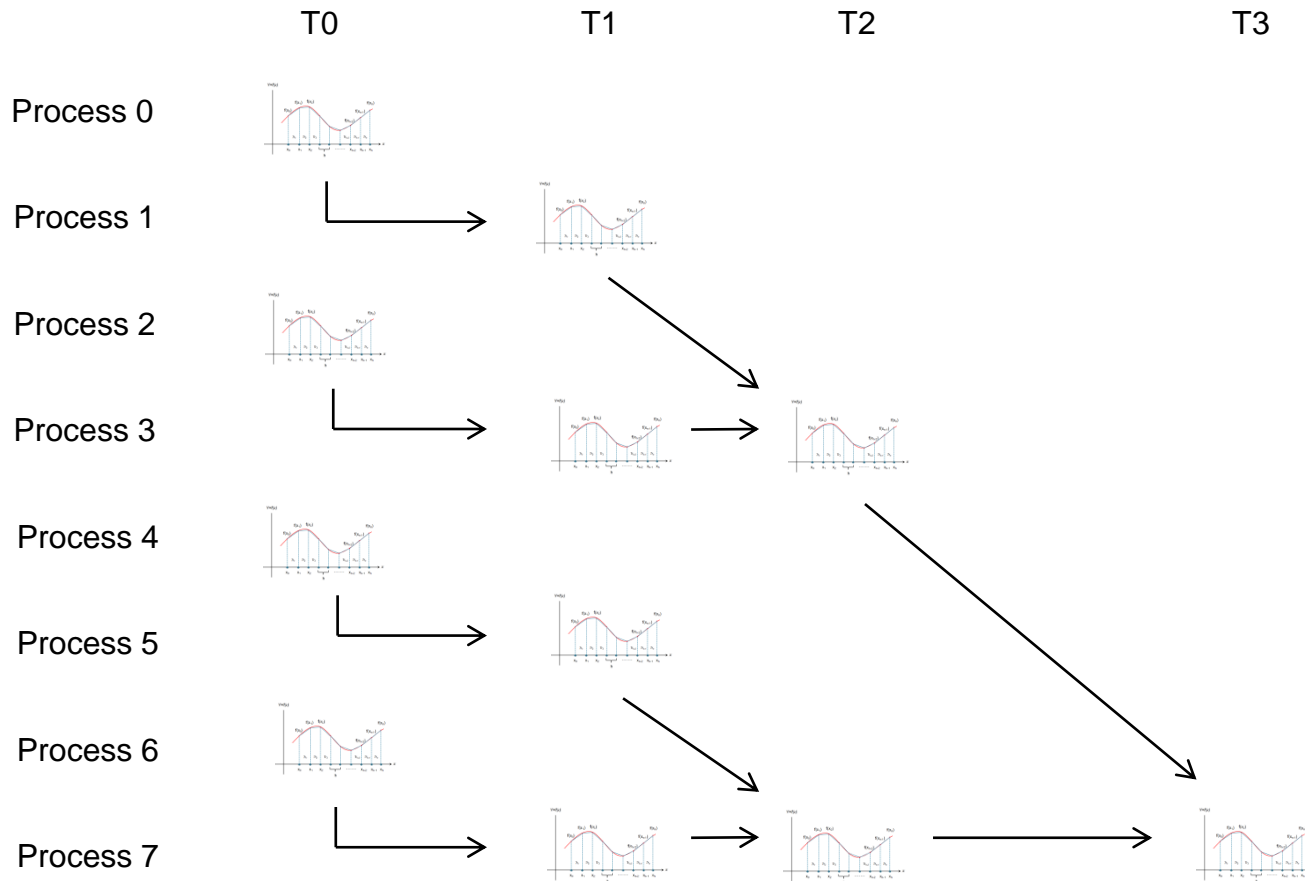
Definite Integral – MPI Reduce/Allreduce

Naïve approach representation:



Definite Integral – MPI Reduce/Allreduce

Optimized approach representation:

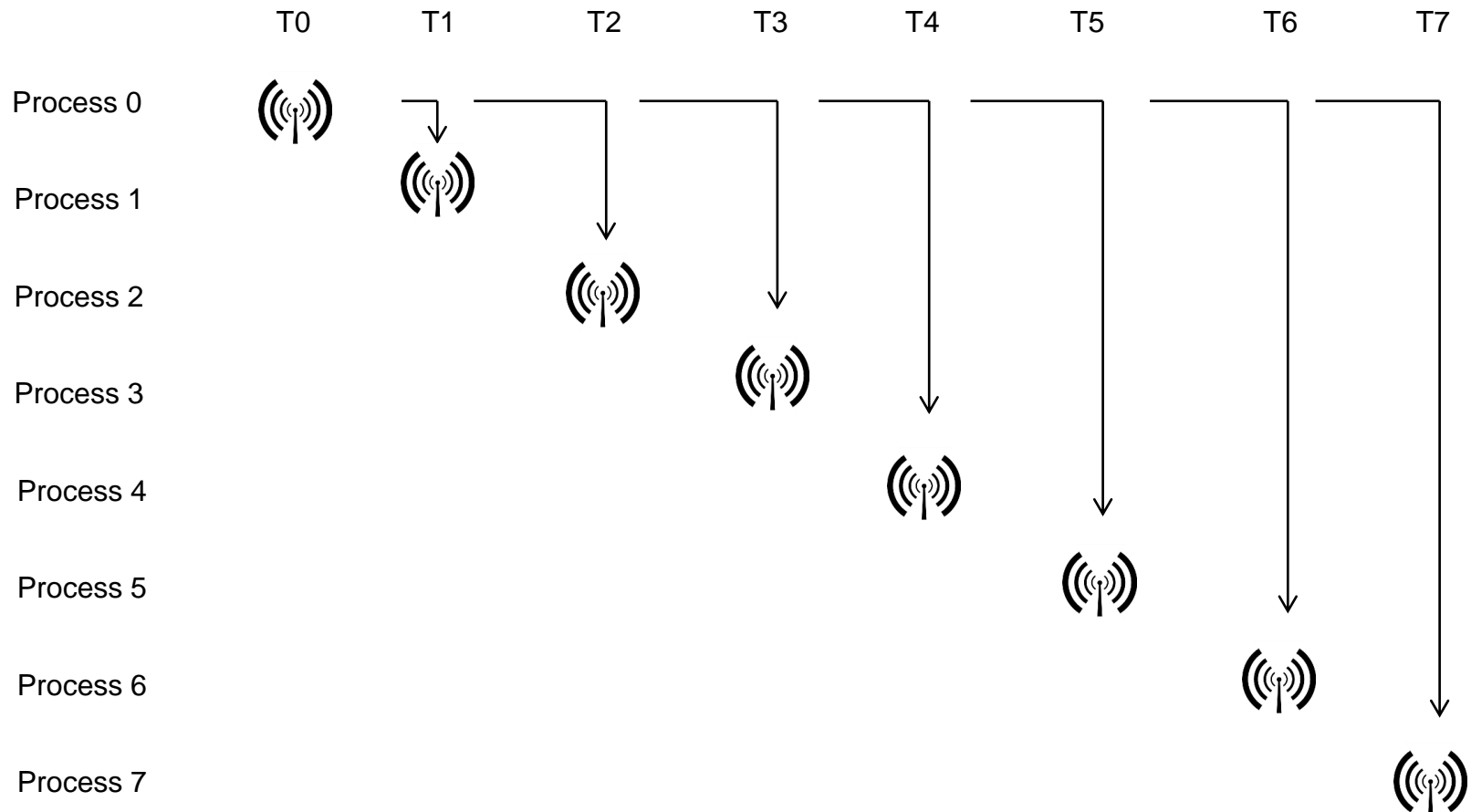


MPI – Implementation

(MPI_Reduce & MPI_Allreduce Commands)

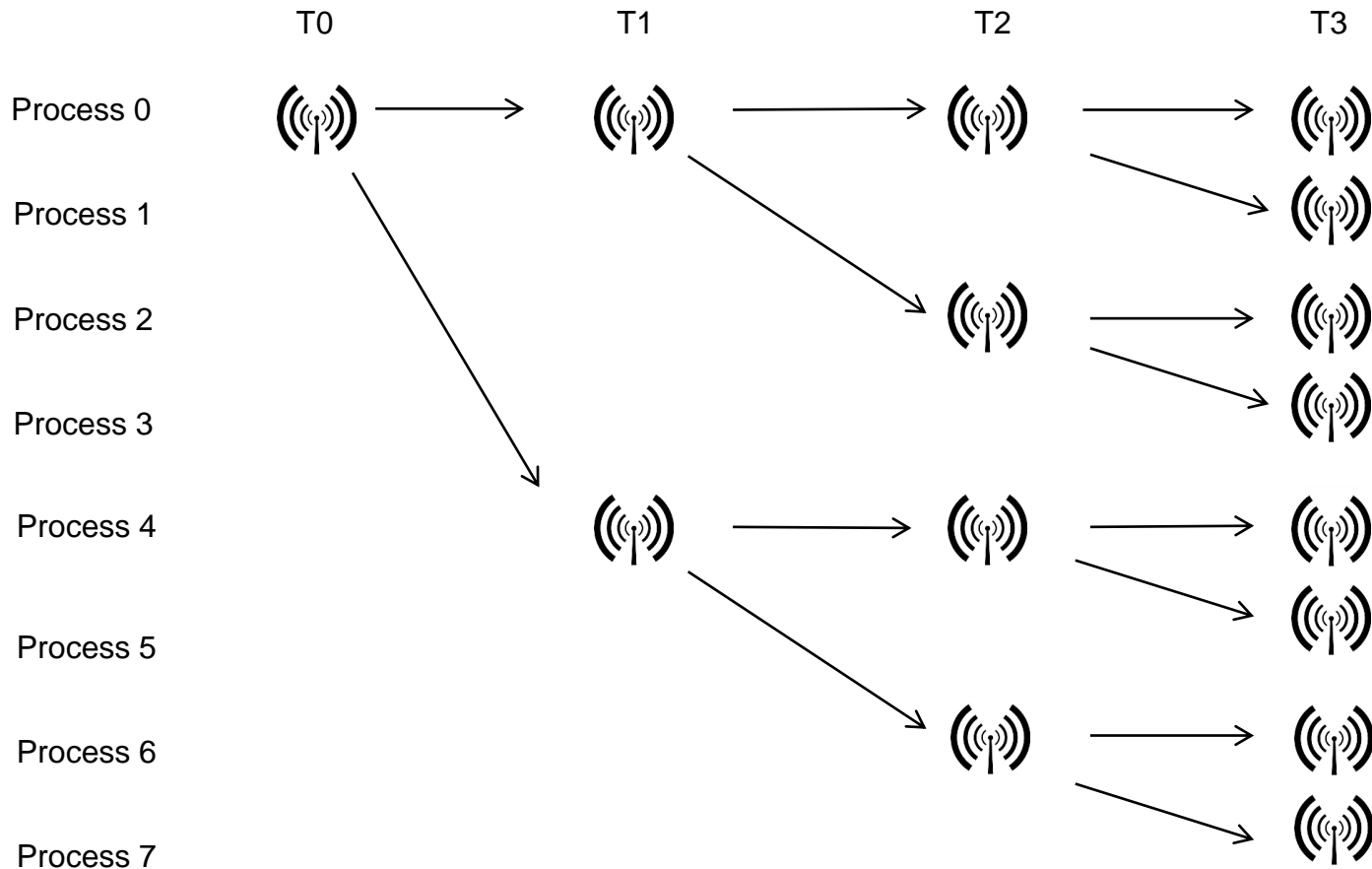
Inter Process Communication – Broadcasting

Naïve approach representation:



Inter Process Communication – Broadcasting

Optimized approach representation:



MPI – Implementation

(Optimized Broadcast Derivation)