

# Introduction of High Performance Computing

## Assignment 2

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### Parallel approximation of $\pi$ using mpi

The aim of this exercise is to calculate  $\pi$  by approximating the same integral of the previous assignment, but this time we will use an OpenMPI approach, by dividing tasks among different processes. Moreover, in order to get used to OpenMPI way of thinking, we will use some specific commands in order to send and receive messages among different processes. Obviously we are interesting in improving the performance with the number of processors. The result of my code is shown below (the entire code is posted on github)

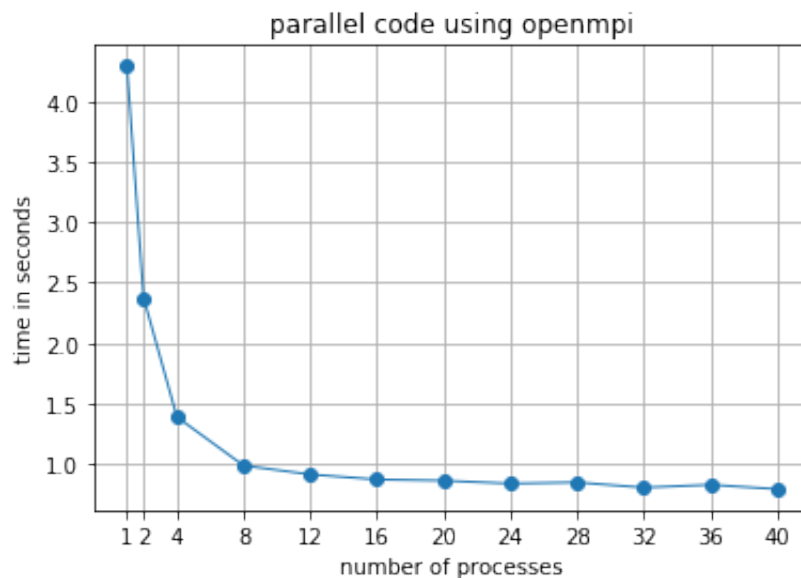


Figure 1: This plot shows to us how time decreases with number of procs; we can see a huge improvement respect than an openmp approach

## Compiling

the code is presented on my github repository and I also wrote a script bash in order to execute it with different number of processors. Obviously in order to use OpenMPI I had to ask 2 nodes of Ulysses in that way

```
1 qsub -l nodes=2:ppn=20,walltime=00:50:00 mpi_pi.sh
```

On my repository you can also find a file .txt where there are precise evaluation of the time in relation of the number of processors