

Serie Advanced MPI

Exercise 1. Derived datatype

- Take one of the ring, send/recv, sendrecv or isend/recv version of the pi code and add a structure containing the sum and rank.

```
struct Sum {  
    double sum;  
    int rank;  
};
```

- Declare a derived data type for this structure
- Modify the summation to sum pi and the ranks.

Exercise 2. Permanent communications

Use the Isend/recv version and modify to use permanent communications instead

Exercise 3. MPI I/O

- Use the `MPI_Allreduce` version of pi for this exercise.
- At the end of the pi code there is a loop writing 15 digits of pi on screen. Instead of writing on screen we want to write on disc.
- Open a MPI File
- Write the digits in parallel in the file using `MPI_File_write_at`

Exercise 4. Parallel I/O in the Poisson code

- Parallelize the IO using a parallel version of DumperBinary
- Check the consistency of the results