

Quantum information and computing

Week 2

Exercise 1: **Latex Template**

Using Latex create a template to submit reports, including:

1. Heading with your name and the date
 2. Footer with exercise number and course name and year
 3. A title
 4. An abstract
 5. Different sections, such as (if applicable)
 - * **THEORY**: Explain briefly the theory you have based your solution on.
 - * **CODE DEVELOPMENT**: Introduce strategies, tests, and report debugging problems, compilations options.
 - * **RESULTS**: Present data and explain your results.
 - * **SELF-EVALUTATION**: What have you learned? What can be done next? What went wrong and why?
- (a) Prepare this – and following – weekly reports using such template. The maximum length of the report is five pages.
- (b) Upload the report in Moodle under the correspondent exercise.
- (c) File names must include your name, exercise number and codewords **REPORT**, and **CODE**. Example: Ex2-Rossi-REPORT.pdf

Exercise 2: **Derived Types**

In Fortran90 write a **MODULE** which contains a double complex matrix derived **TYPE** that includes the components: Matrix elements, Matrix Dimensions, Matrix Trace, and Matrix Determinant.

- (a) Define the correspondent **TYPE**.
- (b) Define a function/subroutine that initializes this new **TYPE**
- (c) Define the functions/subroutines **TRACE** and **ADJOINT**
- (d) Define the correspondent **INTERFACES** of the previous points.
- (e) Define a subroutine that writes on file the Matrix **TYPE** in a readable form.
- (f) Include everything in a test program.