

# Computational Physics Homework # 201.

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When you hand in the homework, you should gather all your files into a single tarball file as follows.

- Use an unix command `tar -czf <file name>.tar.gz <file 1> <file 2> ...`.
- For undergraduate students, put a copy of a tarball `<file name>.tar.gz` into a directory:  
`/physics/upload/comp2023/<user-ID>`.
- For graduate students, put a copy of a tarball `<file name>.tar.gz` into a directory:  
`/physics/upload/acomp2023/<user-ID>`.
- You must use the GNU `make` command and `Makefile` to compile the code starting from the homework `hw101`.

## Quadrature method (II) for Integration

1. In the class, you learned how to calculate a definite integral using the quadrature method. Let us consider the following integrals:

$$I_1 = \int_0^\infty dx \sin(x^2 \sin(\frac{x^2 + 3}{x^4 + 1})) \exp(-x^2) \quad (1)$$

$$I_2 = \int_0^\infty dx \sin(x^2 \cos(\frac{x^2 + 3}{x^4 + 1})) \exp(-x^2) \quad (2)$$

It would not take even a second to realize that we cannot calculate them analytically.

- (a) You need to divide the interval into three pieces. What is your best choice for the dividing points? Explain why you choose them.
- (b) Calculate the integrals using the Simpson rule.
- (c) The results should be printed on the screen in an organized fashion.