

In the name of God

Department of Physics
Shahid Beheshti University

COMPUTATIONAL PHYSICS

First midterm exam

(Time allowed: 3 hours)

1. Error analysis:

A: Explain the main classes of errors with associated examples. (10 points)

B: Deduce the behavior of standard deviation and mean standard deviation with respect to number of measurement. (10 points)

C: Derive one order better than that estimation derived in class for error propagation for secondary quantity ($z = f(x, y)$) and x and y are primary quantities. The covariance matrix for x and y is given by: (10 points)

$$\text{COV} \equiv \begin{bmatrix} \sigma_{mx}^2 & \sigma_{mxy} \\ \sigma_{mxy} & \sigma_{my}^2 \end{bmatrix}$$

2. Number representation in computer:

A: What is the decimal value of IEEE number in floating point representation with single precision "101111100110000000000000000000"? (5 points)

B: Derive the IEEE number in floating point representation with single precision of 347.625. (5 points)

3. Familiar commands in terminal:

A: What is the command to connect a cluster? (assume that the valid IP is 192.168.220.100) (5 points)

B: What is the command to copy a file in cluster to our local computer? (assume that the valid IP is 192.168.220.100) (5 points)

C: What is the command to make a script to executable file? (5 points)

Computational part

4. Compute the mean value and mean standard deviation of "data.txt". In addition use a typical software to plot "data.txt". (send your program, plot and results to movahedsadegh@gmail.com and amitida3513@gmail.com). (15 points)

Good luck, Movahed
