Applied Mathematics Report 1

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Deadline   23:59 on May 21

Submission Solve the following two problems, write the answers in a word or pdf file, and put the file on scomb: `https://scomb.shibaura-it.ac.jp`.

Note Write the date when you made the file, your ID number, and your name in the file. As for the graphs, use some drawing software like gnuplot to draw graphs and embed them in the file of the report. Write the process of calculation. You may hand-write the process of calculation and scan it, but even in that case use some drawing software to draw graphs. I recommend you to use a typesetting system LaTeX. I made the configuration of this report on scomb so that you cannot submit the report after the deadline.

Refer to `http://www.gnuplot.info/` and `https://www.latex-project.org/` for gnuplot and LaTeX. These are free and are also installed on the computers of the Center for Science Information (PCs on the 6th floor).

Problem 1 Fit a straight line (a linear function) to the following four points so that (the half of) the sum of the squares of the distances of those points from the straight line is minimum, where the distance is measured in the vertical direction (the y-direction). Write the process of the fitting, and depict the graph with the four points.

$$(-1, 2), (0, 1), (1, -1), (2, -2)$$

Problem 2 Fit a parabola (a square function) to the following four points so that (the half of) the sum of the squares of the distances of those points from the parabola is minimum, where the distance is measured in the vertical direction (the y-direction). Write the process of the fitting, and depict the graph with the four points.

$$(-1, 0), (0, -1), (1, 0), (2, 4)$$