

# Engineering Mathematics Report 1

Isao Sasano

**Deadline** 23:59 on May 23

**Submission** Solve the following two problems, write the answers in a pdf file, and put the file on scmb.

**Note** Write the date when you made the file, your ID number, and your name in the file. As for the graphs, use some graph drawing software like gnuplot and embed them in 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 graph drawing software. I recommend you to use a typesetting system  $\text{\LaTeX}$ . I made the configuration of this report on scmb 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  $\text{\LaTeX}$ . 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.

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