

Explanation: The received signal level at the terminals of a receiver antenna located between 1-2 km away from the transmitting antenna is measured with 100 m steps. The measured values are plotted in Figure 1 and given in the data file (**pr5data.dat**), where the first column is the distance in m and the second column is the measured signal level in V. Note that the received signal is distorted due to noise, environmental effects, and polarization mismatches.

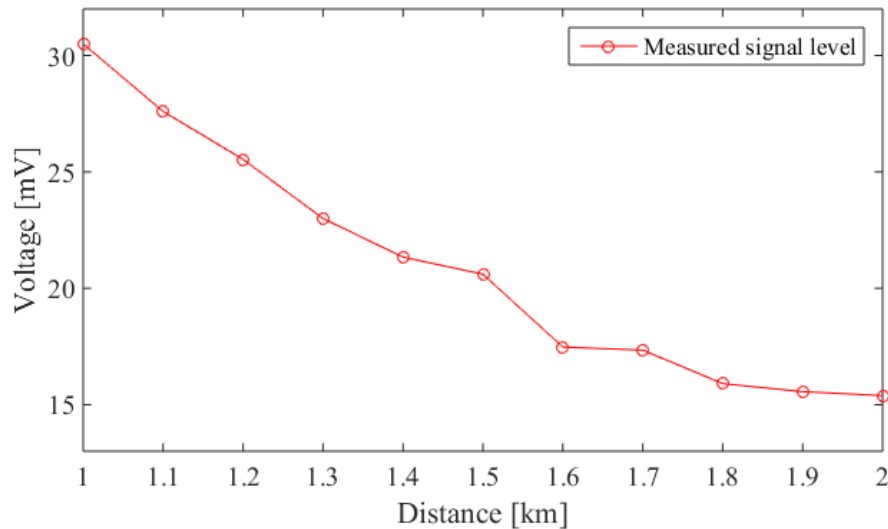


Figure 1: The measured signal level.

Question: Write a code to determine

- (a) Linear least squares polynomial,
- (b) Least squares polynomial of degree 2,
- (c) Least squares polynomial of degree 3

fits to the measured data and compute the errors for each polynomial fit. Also include the followings to your report:

1. Present the formulas that are used to generate the least squares polynomials.
2. Present the error values and coefficients of the polynomial fits in a table.
3. Plot the determined polynomial fits and the measured data.

Suggestions:

- You can use **inv**(\cdot) command in MATLAB to solve linear system of equations in the form $A\mathbf{x} = \mathbf{b}$.
- If your code produces warnings, try to explain the reason of them.
- Do not forget to include your comments to your report.

Notes:

- A report should be prepared as explained in **Homework and Project Report Preparation Guideline**.
- The codes and the report should be student's own work.
- A single, ready to run MATLAB script (m) file should be uploaded along with the pdf and docx files of your report.
- The figures presented in your report should have proper axis labels, legends, as well as figure numbers with proper citation in the report.
- Presenting only the code and plots will be graded with zero points.