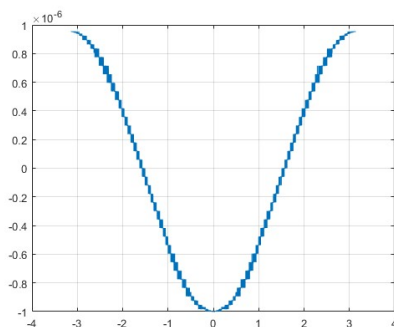
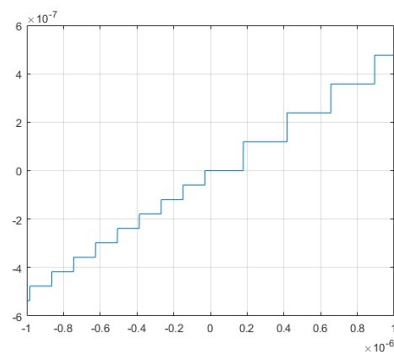


Exercise 2: Rounding errors

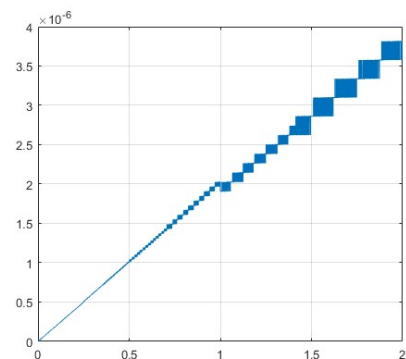
The purpose of this exercise is examining cases where the finite precision representation in a computer can have an impact on the calculations and observe that it is often possible to reduce such impact.

- Represent the following expressions in a short range around the proposed value and observe the results. Use single precision (32 bits) floating-point variables to make the observed effects more obvious (use Matlab function *single* for setting up the variables).
- When two variables are involved, they should be very close to provoke error (2nd and 3rd cases). Vary one of them and define the other by adding a very small constant (e.g., 10^{-6}).
- Note that the result of this exercise may change depending on which computer you run it!

$$\sqrt{x+1} - 1, \quad x \approx 0$$



$$\sin(x) - \sin(y), \quad x \approx y$$



- Rewrite the expressions so that the errors are reduced. Is it possible to eliminate rounding errors completely by rewriting?
- Prepare for a short explanation to your classmates. The exercise is run in groups.