Problem 1:

We are reporting the infinite-norm of the residual and absolute errors.

The residual gains significant digits for n = 5, which is: 4.440892098500626e-16.

The absolute error always has some significant digits…

Maybe I have misunderstood this question?

Uncomment print statements to see the actual errors.

Problem 2(a):

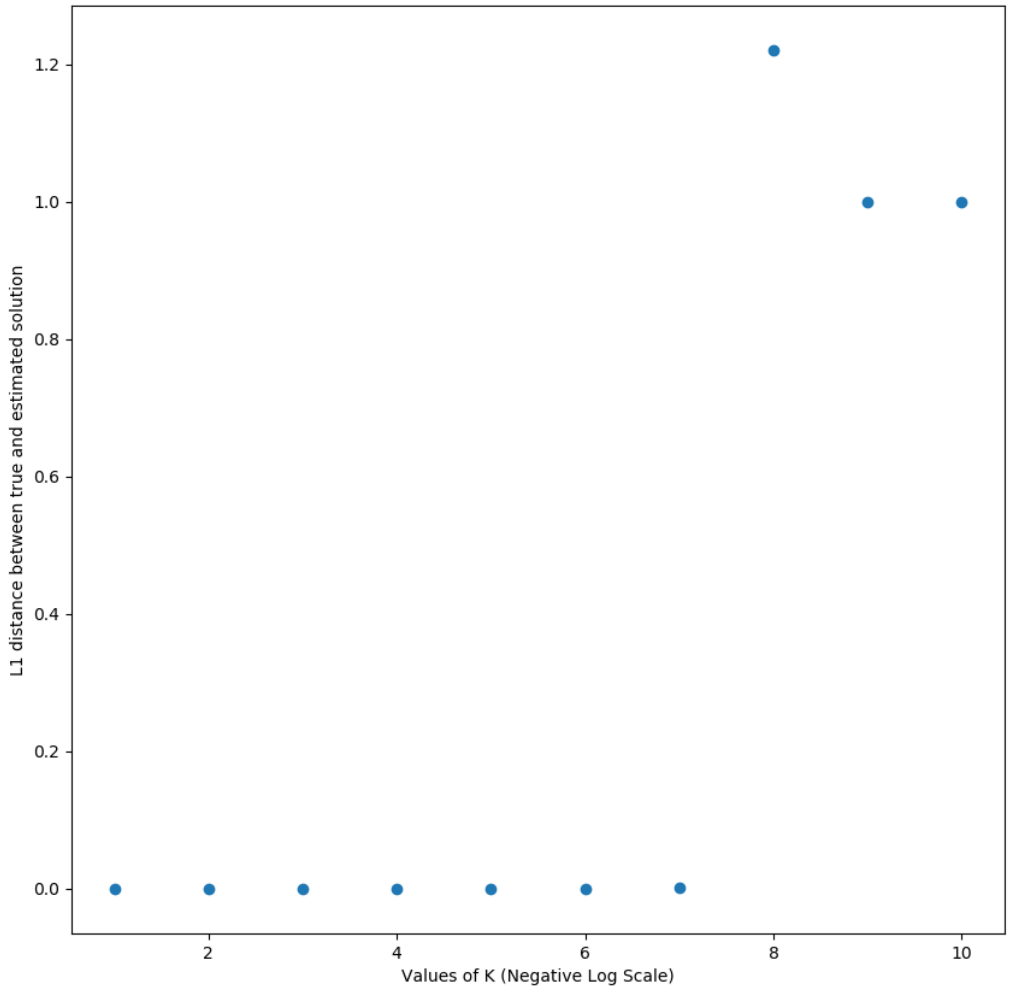

fig: L1 norm distance between the true solution and our estimate

Observations:

It is apparent that error quickly increases (as measured by L2 distance) for values of epsilon close to 1e-16, converging to $[0\ 1]^T$.

Problem 2(b):

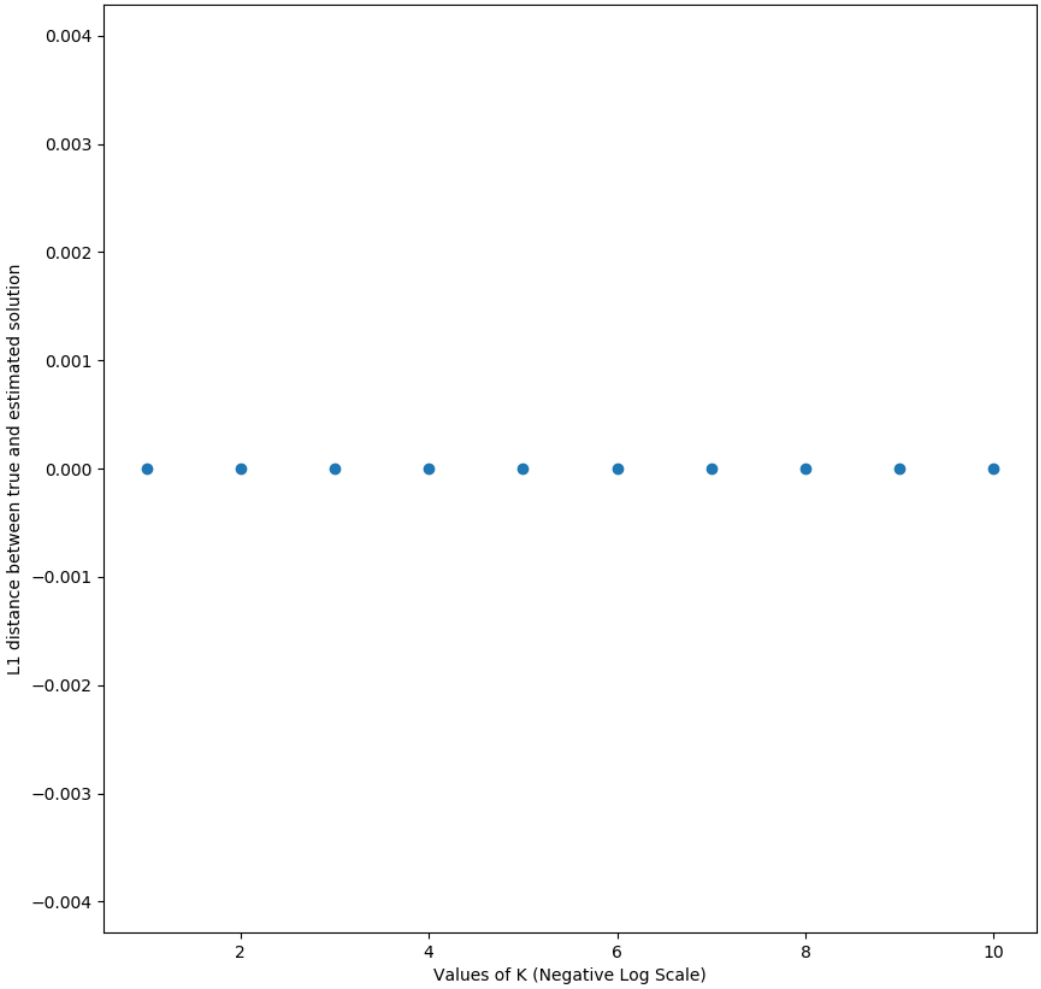

Fig: L1 norm distance between true solution and our estimate

Observations:

There seems to be no error! It is likely the case that whatever error is there is less than the machine precision. Iterative refinement and partial pivoting has provided numerical stability to the system of equations.