

CS513, Spring 21
Prof. Ron

HW #7, Factor=.5

Due March 12, 2021

(1) Factor=.35

This question continues Q.1 HW4, by addressing condition numbers. The referenced display is from HW4, too.

(c) Use the claim in (b) in order to find a formula for $c_2(A)$ ($:=$ the condition number of A) in terms of $\sigma(A'A)$. Explain.

(d) Use the claim in (c) together with Q.2 in HW4 in order to find a formula for $c_2(A)$ in terms of $\sigma(A)$, *in case A is symmetric*. Explain.

(e) Check your claims in (c) and (d) against the matrix in display (88), and against a non-symmetric matrix of your choice.

(2), Factor=.15

Find three different least square solutions to the system $Ax = b$, where

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{pmatrix} \quad b = (1 \ 0 \ 1)' .$$

Is there a contradiction between the fact that you have found multiple solutions and the theorem proved in class that guarantees the solution to be unique? Explain.