

Precept 4

Agenda

- · Approx solns of linear eans w/ multiple RHS
- · Varying the RHS in linearly constrained LS
- · Nearest vector w/ given average
- · Rendez-vous

• PDF Latex on Colub & coding

Logistics

- · HWI
 - solvs on Canvas
 - grades sent out
- Hw 3
 - due Friday Feb 26 at 9pm
 - Several mistakes fixed, pull latest version
- · Midtern Thursday March 11
 - 120 minute exam
 - no coding required

- · Approximate solution of linear equations w/ multiple PHS's
 - · Suppose A is invertible
 - · Seek x s.t. Ax ≈ b; i=1,..., k
 - Bob proposes a multi-objective least squares approach $x^{Bob} = argmin ||Ax-b_i||^2 + ... + ||Ax-b_k||^2$
 - Alice proposes to first average the bis to get $b = \frac{1}{k} (b_1 + \dots + b_k). \text{ Then choose } \times \text{ by Solving}$ one system of linear equations.

 AxAlice = b
 - · Oscar says that the 2 approaches sound different, but $x^{Bob} = x^{Alice}$, Is Oscar right?

Alice's approach

Bob's approach : multi-objective

· Varying the RHS in linearly constrained least squares

. suppose $\chi = argmin ||Ax-b||^2$

sit. Cx=d

- · Assume KKT matrix is invertible
- . Think of & as a fn of b and d
- A colleague asserts that $\hat{\chi}$ is a linear fn of b and d and hence, has the form $\hat{\chi} = Fb + Gd$ for some appropriate matrices F and G.
- " Is she right? If not, give a counter-example.

 If so, justify and explain how to find F and G.

- Nearest vector w/ a given average
 - · a eR^ / BER
 - · find x that is closest to a among all n-vectors that have an average value of 13