Math 290  Friday, January 29

Writing

- two files
  - linear @ beezer.privacyport.com
  - File names!!!
    - beezer-SLE-2.pdf
  - Before class

Exam

- laptop, wireless
- On RREF by hand
- Sage matrix(), A.rref()
- Old exams on course page

Section NM  Writing SLE
- Mon - Problem Session
- Tue - Exam SLE
- Thu - V0

PDFs test 😊
Non singular Matrices

A non-singular $\iff$ solutions to $LS(A, \mathbf{b}) \iff N(A) = \{ \mathbf{0} \}$ $\iff$ A row-reduces to $\mathbf{I}$

A singular $\iff$ solutions to $LS(A, \mathbf{b}) \not\iff N(A) \neq \{ \mathbf{0} \} \iff$ A does not row-reduce to $\mathbf{I}$

cannot reversible

\[ A \iff B : \text{ If } A \text{ then } B \text{ or if } B \text{ then } A. \]
Theorem NMUS

A nonsingular $\iff$ \( \text{LS}(A, b) \) has a unique solution for every choice of \( b \).

\((\Rightarrow)\) Assume \( \text{LS}(A, b) \) has unique solution for every \( b \).

Choose \( b = 0 \).

So \( \text{LS}(A, 0) \) has a unique solution, the zero vector.

So \( A \) is nonsingular.

\((\Leftarrow)\) A nonsingular, study \( \text{LS}(A, b) \) (solve for any \( b \)).

\[ [A | b] \xrightarrow{\text{REF}} \begin{bmatrix} \vdots & \vdots & \vdots \\ \vdots & \vdots & \vdots \\ 0 & 0 & 0 \end{bmatrix} \]\n
One solution is $c$. 