Exam Review 1

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Contents

1 1.1

- Gauss-Jordan Elimination
  - Add a multiple of one row to another
  - Swap 2 rows
  - Multiply a row by a constant

2 1.2

- Solve system to get solution with parameters
  - Use Gauss-Jordan to get rref

- How do we see if the system has n solutions
  1. If after doing gauss-jordan elimination, the last row is all 0s, and the rhs is non-zero
     - No solutions
  2. All zeros but one of the lhs vars is not
     - $X_n = 0$
  3. # of nonzero rows < # variables
     - Infinite solutions
     - # of variables - number of non-zero rows

3 1.3

- Write a matrix product as a linear combination of columns
  - \$ $A\vec{x}$ => $column_1 x_1 + column\{2\} x_2 + \ldots + column\{n\} x_n$
- Do matrix multiplication
  - $A_{m \times \mathbf{n}} B_{\mathbf{n} \times o}$ => $(AB)_{m \times l}$
  - Row of first matrix, times column of second matrix
- Compute the trace

4 1.4

- Find inverse of A and solve $A\vec{x} = \vec{b}$
- $A_{3 \times 3}$ => [A | I] -> gauss-jordan -> [I | A^{-1}], after having A^{-1}, $A\vec{x} = \vec{b}$
- Apply inverses to isolate variables

5 1.5

- Find E so that EA = B, where A&B are given
  - Realize the change in A to get B, a single row operation

6 1.6

- Find b for $Ax^{\rightarrow} = b^{\rightarrow}$ to be consistent
- Given $Ax^{\rightarrow} = b^{\rightarrow}$
  - $[A \mid b^{\rightarrow}] =>$ gauss-jordan elimination
  - $\begin{bmatrix} * & (any) & (any) \\ 0 & * & (any) \\ 0 & 0 & * \end{bmatrix}$
  - Analize the last row to
- $m = 0$, n is an expression of b_1,b_2, and b_3
- then set $n = 0$, solve for b_1,b_2, and b_3
- Use parameters t, s (if needed) to write the solution
  - b^{\rightarrow} = t[] + s[]$

7 1.7

- Just memorize things
  - Diagonal matrix
  - Triangular matrix
  - Skew matrix
  - Symmetric matrix
- $A_{n\ x\ n}$, $B_{n\ x\ n}$
  - $(AB)^T = B^T A^T$
  - $(AB)^{-1} = B^{-1} A^{-1}$
  - $(A^{-1})^T = (A^T)^{-1}$