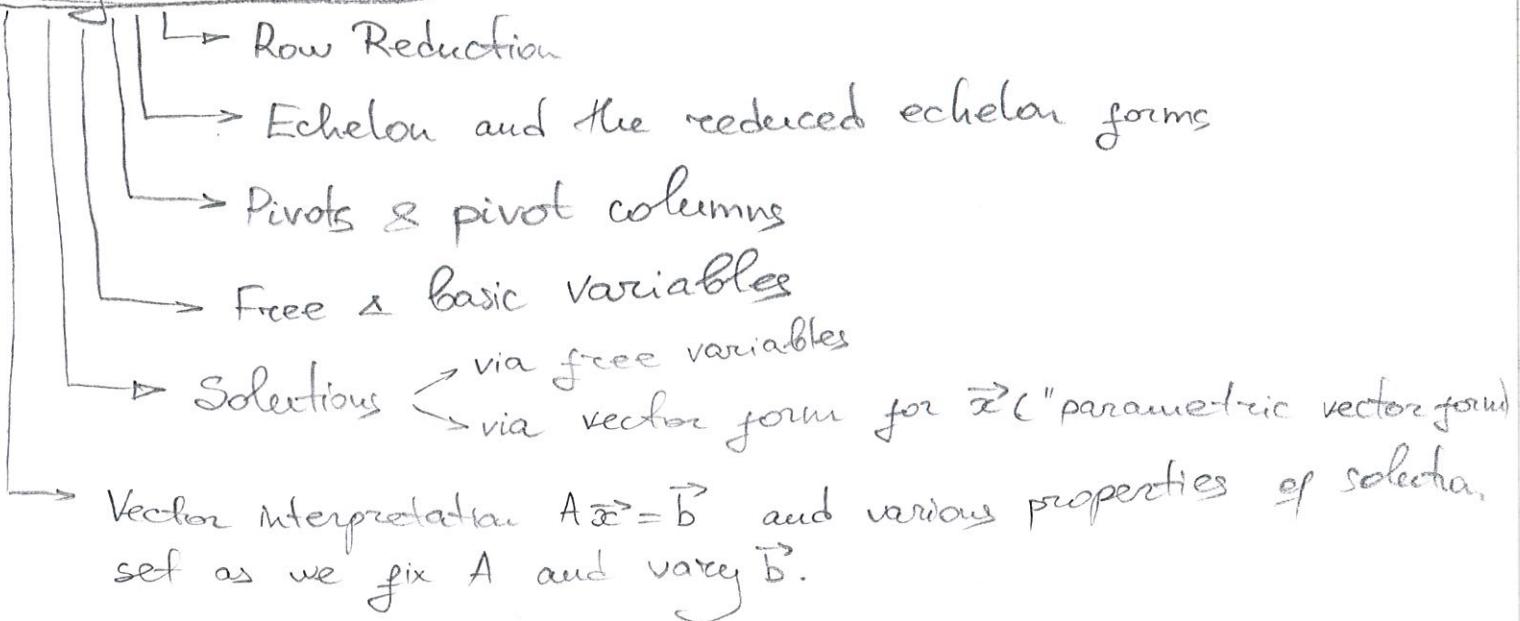


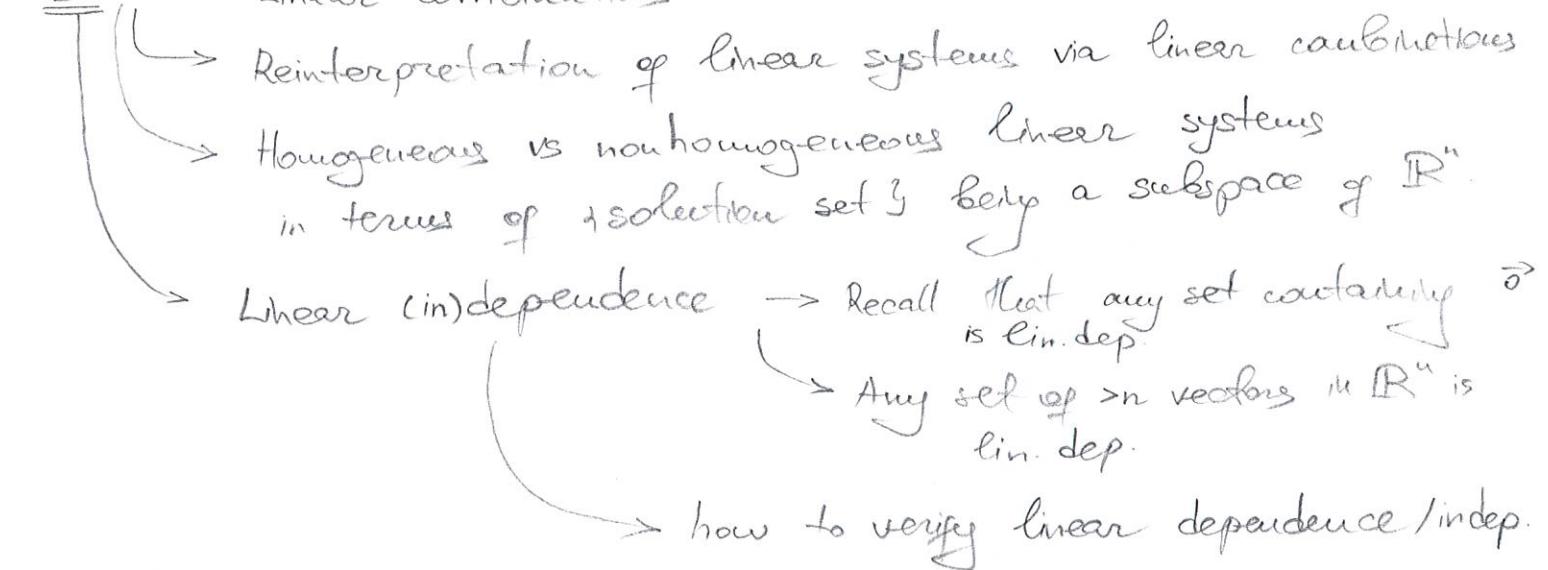
Lecture #28

Revision Section #1

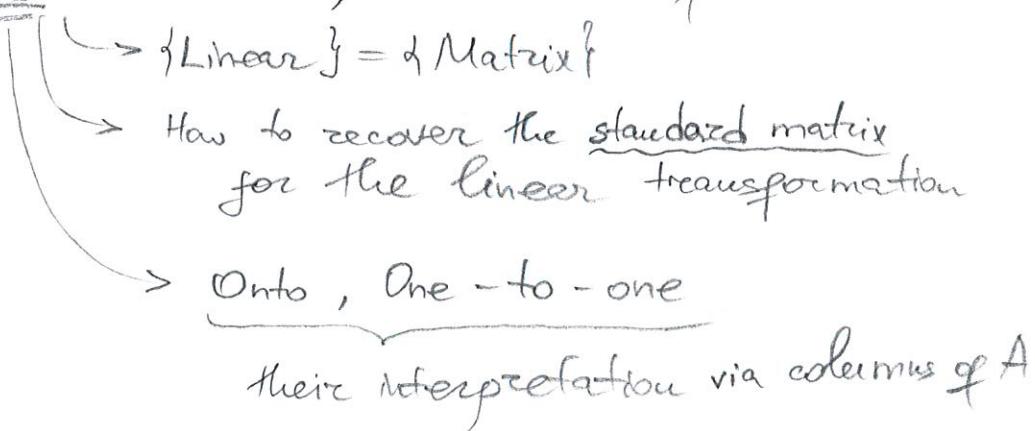
• Solving linear systems



• \mathbb{R}^n → Linear combinations



• Linear Transformations → Linear, Matrix transformations



Lecture #28

- Matrices → Multiplication & its properties
 - Transposition & its properties
 - Inverse & its properties
 - Formula for A' when A is 2×2 -matrix
 - Algorithm for computing A' via row reduction of $(A|I)$.
- Subspaces of \mathbb{R}^n → Definition
 - Span
 - $\text{Col}(A)$, $\text{Null}(A)$, $\text{Row}(A)$
 - Bases of subspaces
 - Bases for $\text{Col}(A)$, $\text{Null}(A)$, $\text{Row}(A)$
via echelon forms of A .
 - Dimension of a subspace
 ↳ $\text{Rank}(A) := \dim \text{Col}(A)$.
- $\dim \text{Col}(A) + \dim \text{Null}(A) = \# \text{ columns of } A$.

Lecture #28

- Determinants → cofactor expansion
 - $\det(\text{triangular matrices})$
 - computation via row reduction
 - A -invertible $\Leftrightarrow \det A \neq 0$
 - $\det(AB) = \det(A) \cdot \det(B)$ & $\det(A^T) = \det(A)$
 - Cramer's rule & Inverse formula
 - Area & Volume via det
- Vector Spaces → Definition & Examples
 - Subspaces
 - Linear combinations, Span
 - Linear transformations
 - Kernel, Range
 - Linear (in)dependence
 - Bases
 - Spanning set theorem (§ 4.3)
 - Bases for $\text{Col}(A)$, $\text{Row}(A)$, $\text{Null}(A)$
 - Dimension
 - Basis Thm (§ 4.5)