Exam 2 : wed April 3

- Material from 3.1–3.7
  HW4 – HW7

find bases for RS(A), CS(A), NS(A) } A is m×n
- determine dim. of each
- rank(A) + dim NS(A) = n

know the relationship between column space and solutions to $A\bar{x} = \bar{b}$

$A\bar{x} = b$ has a unique soln if and only if $\vec{b} \in CS(A)$

Determine whether set of vectors forms a basis for a given vector space.

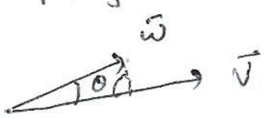
Determine if a set of vectors ~~are~~ is linearly independent.

Determine if a subset of a vector space forms a subspace.

vectors = Basics.

vector projections

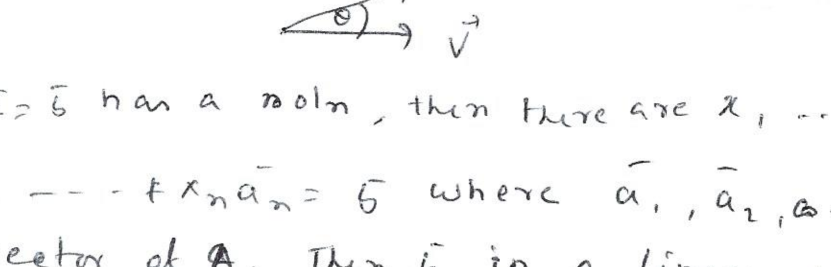
the projection of $\vec{u}$ onto $\vec{v}$

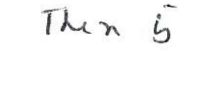


$$\vec{w} = \left(\frac{\vec{u}\cdot\vec{v}}{\vec{v}\cdot\vec{v}}\right)\vec{v}$$

use this to find a vector $\vec{p}$ which is orthogonal to $\vec{v}$
perpendicular

$\vec{p} = \vec{u} - \vec{w}$





Assume, $A\bar{x} = \bar{b}$ has a soln, then there are $x_1, \dots x_n \in R$

$x_1\bar{a}_1 + x_2\bar{a}_2 + \dots + x_n\bar{a}_n = \bar{b}$ where $\bar{a}_1, \bar{a}_2, \dots \bar{a}_n$ are the column vector of A. Then $\bar{b}$ is a linear combination of the column of A.

So by def. $\vec{b} \in CS(A)$.