• **Unit Vectors:-** Those vectors whom magnitude is equals to 1 are called unit vectors.

: **Norm:-** Norm is a function from the real or complex vector space to a non-negative real number which can be used in many ways such as distance from the origin.

• **Hermitian:-** The sum of a square matrix A and its conjugate transpose is called Hermitian.

•

• **Skew-Hermitian:-** The diffrence between a square matrix A and its conjugate transpose is called skew Hermition.

• **Unitary matrix:-** Unitary matrix are the matrix whose inverse equals it conjugate transpose. The unitary matrix is the complex analogue of real orthognal matrices.

• **Forier Series:** seprates a periodic function f(x) in a combination of all of its basis functions sin(nx) and cos(nx).

• **Similar Matrices:** If A and B are two matrices than we say that B is similar to A if there is an invertible matrix P such that:

$$B = P^{-1}AP.$$

• **Subspace:** A subset W of a vector space V is called subspace of V, if W is itself under the addition and scalar multiplaction in V.

• **Orthognal matrices:** Two matrices are said to be orthagonal if they are perpendicular. i.e: there dot product is zero.

• **Equal matrix:** Two matrices are said to be equal if they have same dimmensions or order and there corresponding elements are identical.

Scanned with CamScanner

- **Row Space:** If A is a $m \times n$ matrix then, the subspace of R^n spaned by its row vectors are called the row space.
- **Column Space:** If A is a $m \times n$ matrix, then the subspace of R^n spaned by its column vectors are called the column space.
- **Null Space:** The solution of homogeneous system of equations $Au = 0$, ~~span~~ ~~where~~ which is the subspace is spaned ~~by~~ of R^n, is called the null space.
- **Linear Combination:** If w is a vector in vector space V then w is called the linear combinations of vectors $\{v_1, v_2, v_3, \ldots v_n\}$ in V, if w can be represented in form:- $w = k_1v_1 + k_2v_2 + k_3v_3 + \ldots + k_nv_n$ where $\{k_1, k_2, k_3 \ldots, k_n\}$ are the scalars.
- **Linear Independance:** Let $S = \{v_1, v_2, v_3, \ldots v_n\}$ is the set of two or more vectors in vector space V then they are called linear Independance set if no vector in S can be expressed as linear combination of others.

• **Linear dependent**:- The set that can be expressed as linear combination of others and not linear independent is called linear dependent set.

• **Cross product**:- The cross product or inner or scalar product of two matrices u and v is given and denoted as:-

$$UV = U_1V_1 + U_2V_2 + U_3V_3 + \cdots + U_nV_n$$

and also:-

$$U \cdot V = |U||V|\cos\theta$$

• **Magnitude**:- If $V = \{v_1, v_2, v_3, \cdots v_n\}$ is a vector in R^n then the magnitude of V denoted as $||V||$ and defined as:-

$$||V|| = \sqrt{v_1^2 + v_2^2 + v_3^2 + \cdots v_n^2}$$

• **Rank:-** The common dimmensions of row space and column space of matrix A is called its rank. And is denoted by rank(A).

• **Naulity:-** The dimmensions of the null space of a matrix A is called its naulity.

• **D/f b/w Echelon and reduced Echelon?**

Echelon	Reduced Echelon
• The solution of the row echelon is not unique	• The solutions of the reduced row echelon is unique.
• Infinite solutions.	• Only one solution
• Contains non-zero element at upper right corner only.	• Every column contains elements one and zero only.

• **Orthognal Basis:-** The row of an orthognal matrix are its orthognal basis.

If the length of row is 1 then they are mutually perpendicular.

Similarly, the column of an orthognal matrix are its orthognal basis.

• **Basis:-** If $S = \{v_1, v_2, v_3, ---, v_n\}$ is a vector in finite-dimmensiona vector space V then S

... of V if:

- **Dimmensions:-** The dimmension of a finite-dimmensional vector space denotes as D[V] and defined to be the number of vectors in Basis of V.
- **Eigen Value:-** $Ax = \lambda x$ for some scalar λ. The scalar λ is called the eigen value.

  Eigen value = Charactrestic value.
- **Eigen Vector:-** If A is an $m \times n$ matrix then the non-zero vector x in R^n are called its eigen vector.

  In eq. $Ax = \lambda x$, x is called corresponding eigen vector.

  Eigen vector = Charactrestics vector.
- **Positive definite:-** A positive definite matrix is a symmetric matrix with all possible eigenvalues.
- **Complex matrices:-** Matrices whose values are real ~~as~~ ~~well~~ or complex are called complex matrices.
- **Charactrestic Equation:-** The equation which we solve to get the / find the matrix's eigen values.

$$|\lambda I - A| = 0.$$

lineax combi...

- L-U Factorization / Decomposition:- The factorization of a square matrix A a

$$A = LU$$

where L is the lower triangle and U is the upper triangle is called L-U factorization.

- Standard Basis:-

- Argumented Matrix:-