Thrm 1.1 - Crammas rule Thrm 4.12 - A'=(/detA) Adj A , where the Adjoint motix is a transposed matrix of colactors

Evalues & Evectors of 1xn Matrices

The eigenvalues of a square matrix are precisely the solutions & of the equation det(A-XI)=0

* To final Evalues, Eventors, Espaces & Cases for A, an nxn matrix:

1) calculate the characteristic polynomial det(A-XI) of A

2) find the Evalues of A solving the characteristic equation = 0

3) for each Evalue X, final the null space of the matrix (A-XI). This is the Espace, Ex, with vectors as Eventors

4) Final a basis for each Espace.

Algebraic Multiplicity- of an Evalue is the number of times it is the root of the characteristic equation Geometric Multiplicity-of an Evalue is dimEx, the dimension of the Espace

Thrm 4.16-A square matrix is invertable if 0 is not an Evalue of it.
Thrm 4.17-++FTIM;

n) det A = 0

010 is not an Evalue of A.

Thrm 4.18-Let A be a squeure matrix with Evalue & corresponding to Evector & a) for any positive intercer n, X is an eigenvalue of A with corresponding Evector & lang integer if invertible)

b) of A is invertible then \(\tau \) is an eigenvalue of A with corresponding Evector \(\tau \)

Thrm 4.19-Suppose the nxn matrix has Evectors v, v...v. with corresponding Evalues \(\lambda_1, \lambda_2 \ldots \ldots \)

R' that can be expressed as a LC of these Evectors -

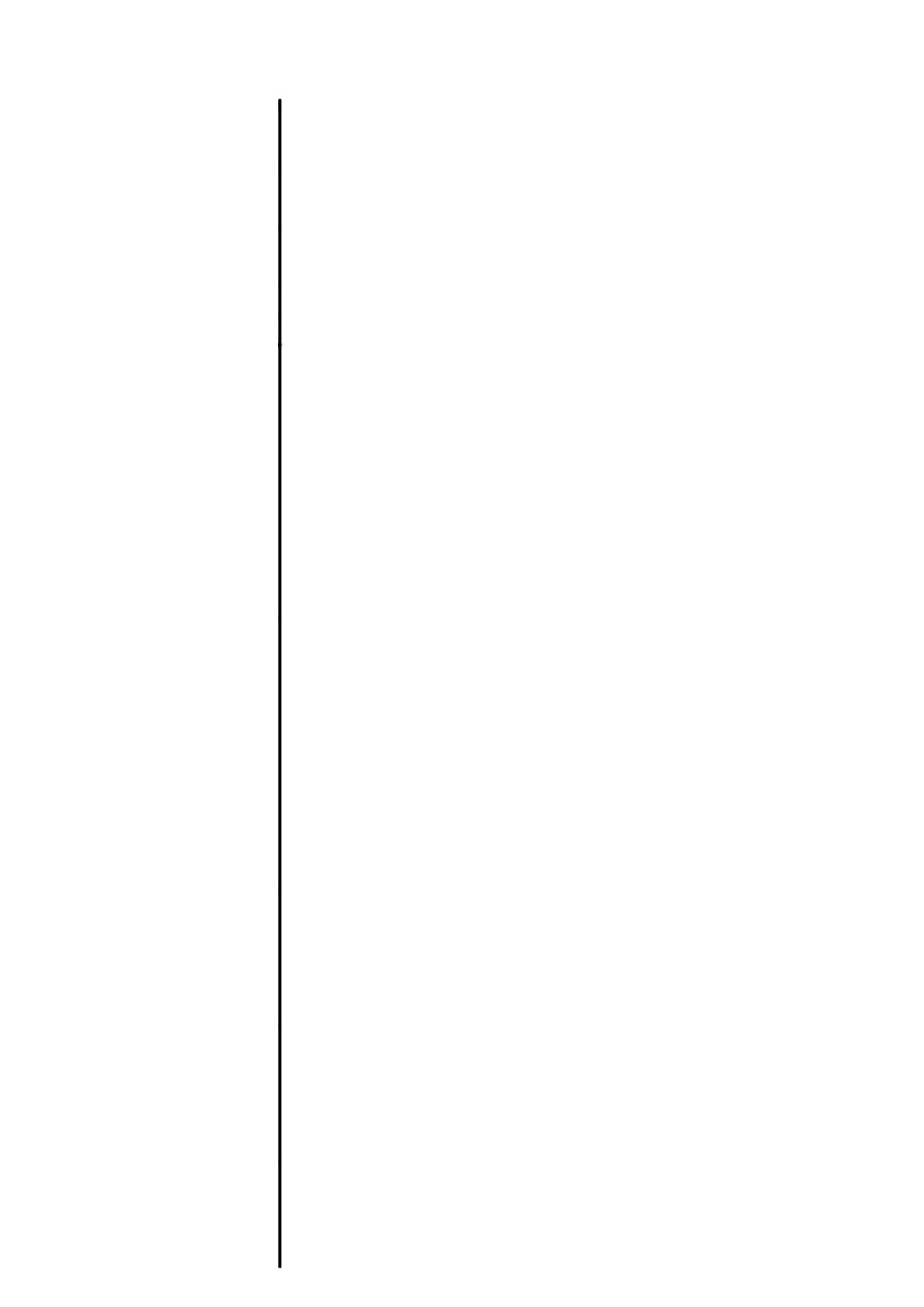
 $x = c, v, +c, v_2 + \cdots + c_m v_m$, thun for any integer K;

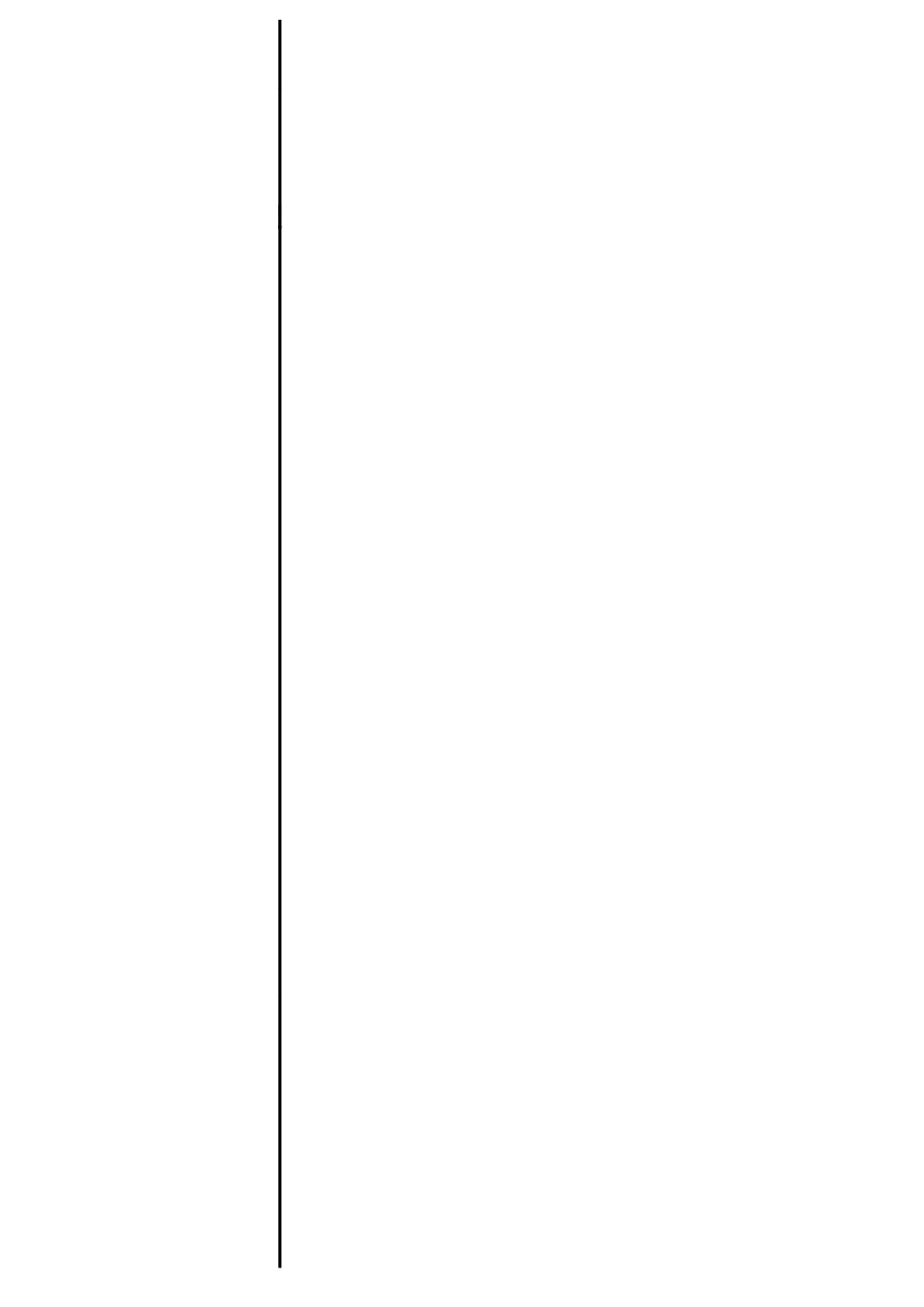
 $A \propto = C_1 \lambda_1^k V_1 + C_2 \lambda_2^k V_2 + \dots + C_m \lambda_n^k V_m$

Thrm 4.2- Eigenvectors corresponding to destinct Evalues are L.

Similarity & Diagonalisation

Similar Matrices-let A & B be non matrices, A is similar to B if there is an enorlable non matrix P such that P'AP = B -> AP = AB If A is similar to B we write A ~ B Thm 4.21-c) / Aub & B & C then Au C



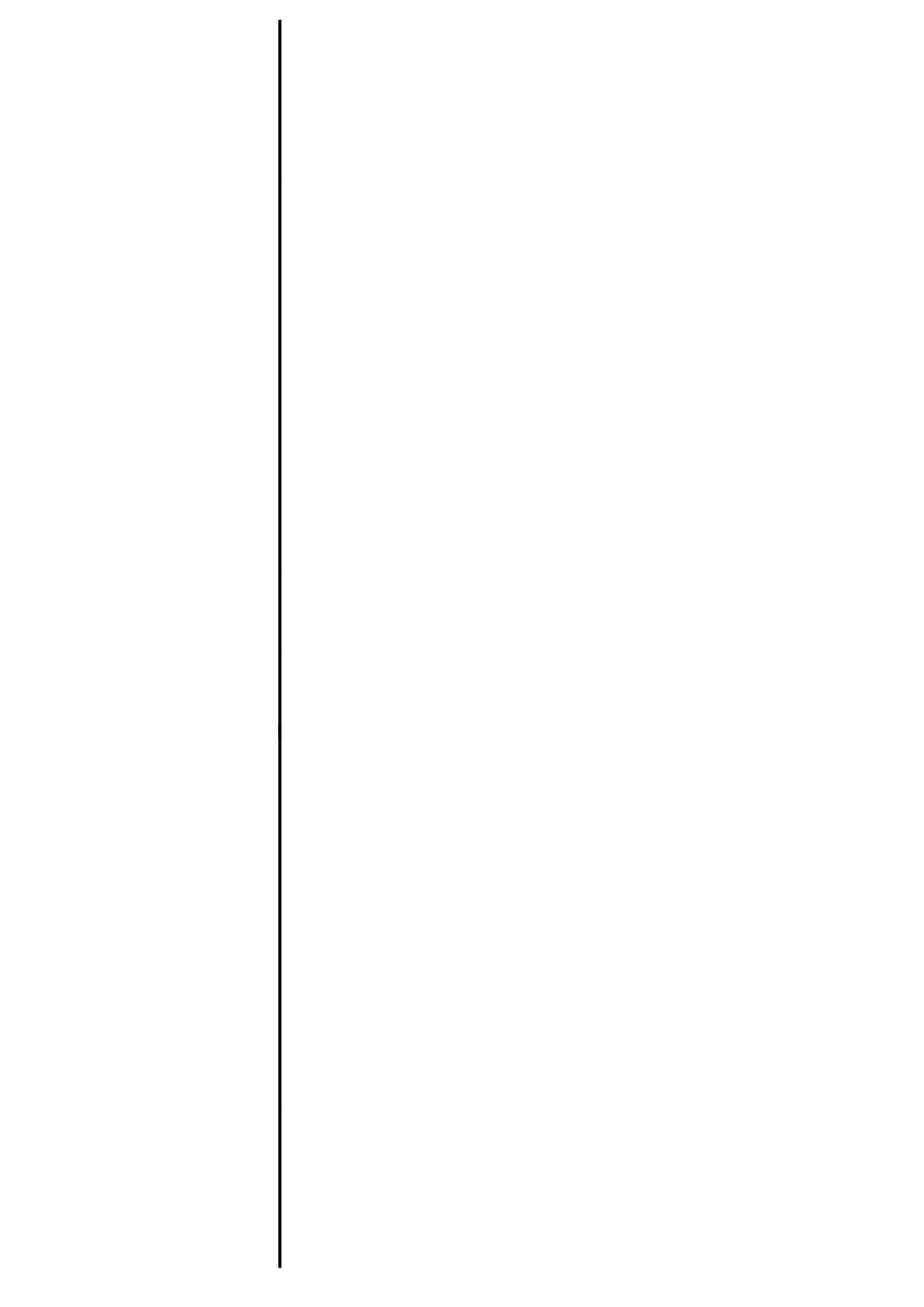


Ihm 4.22-Let ArBbe nxn matrices. Then; 6) A is invertable if B is invertable c) A & B have the same rank d) A & B have the same characteristic polynomical e) A & B have the same eigenvalues B Am By for all intergers m>0 (for all intergers · Two motrices can have their proporties in common . Them 4.22 better used to show 2 motrices are r Diagonisable if there is a diagonal notinix D su Thurs 413 - Solding Diago Aller

cers il invertable)
and still not be Similar...
at Similar

on that A is similar to 12. (P'AP=D)

 $\begin{bmatrix} y' & 0 & 0 \end{bmatrix}$



Thrm 4.23 - Southing Diagon Alky A is diagonisable if A has LI eigenvectors;

Specifically, PAP = D is satisfied if columns of p

and the diagonal entries of D are the eigen

Thrm 2.42 - the total colection of basis vectors for all

Thrm 4.25 - If a is an nxn matrix with a distinct * Thrm 4.27- The Diagonalisation Theorem Let A be an nxn matnx whose distinct Evalues are a) A is diagonisable b) The union B of the bases of the Esporce of A c) The algebraic multiplicity of each Evalue ega

 $\longrightarrow \left[\begin{bmatrix} \xi \\ \end{bmatrix} \begin{bmatrix} \xi \\ \end{bmatrix} \begin{bmatrix} \xi \\ \end{bmatrix} \end{bmatrix} - \begin{bmatrix} \lambda & 0 & 0 \\ 0 & \lambda & 0 \end{bmatrix} \right]$ are n linearly independent eigen vectors of A values of A corresponding in the Scine croler leigenspaces are L1

Exclus, then a is cliagonisable $\lambda_1, \lambda_2 ... \lambda_K$, the following 3 athunts are equivalent; contains n vectors

cals is geometric multiplicity

