MFML Assignment NO.1 - 2023Acos - 2023AC05339 0 Ans. Let A Be the Investible lower triangular matrix 0-1 30, By the property of Inverse AA' = TConsider A'' = B11. If J=1As we know lije = \ Orifiti $\begin{array}{c|c}
A_{11}, A_{12}, A_{13} & A_{10} \\
\hline
B_{1} & B_{1k} \\
\hline
B_{1k} \\
B_{2k} \\
\hline
B_{1k} \\
B_{1k} \\
\hline
B_{1k} \\
B_{1k} \\
\hline
B_{1k} \\
B_{1k} \\$ ⇒ £ AijBjk= 1 1, if t=k -€ from @ for ick overhave ZAjBjk=0 3 But As A is lower tringular matrix
Aij +0 for isj. So for equation 3) to be 0,

As Bjx =0 all lument above the diagonal are £0. — @

Ako Agu-we know, For matrix
to be invertible,
diagonal element should \$0

That also implies

There of making also have

non-zeron elements.

from equation () q (8) we prove that B is lower triangular matrix

Here we proved Inverse of lower friangular making is lower friangular making.

ideas religion of react of A A And and

o si of the ment of a

(3) P.2

Ans.

let A be the square matrix with integer element of detCA) = nx -6 let he have he be the eigenvalues where n is also part of those valu.

As we know.

det (A) = prodult of eigenvalues of A

det (A) = lix hix hz ... nxhm = Dallxlexl3 -- km

since all element is integer for matry.

A: so determinent is also integer.

· · px (Ai) where i= 1.... m

is also integer.

As n's already given integer l'i must he from equation (2) integer integer

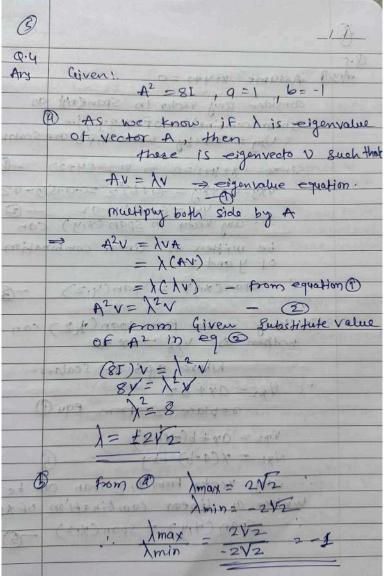
det(A) = nk = n \(\)

nk= lin K = No

As hi is integer K is also integer

Hence proved

(F)	
	g.P.
Ans	Alma Land
acadai	Given: square whose inverse exists.
0	-> B is making such that AB can Be
(3)	alefined and more
- 253day	morio with all the last to
	from given AA = I (As A enists)
2000	AA = 1 (A) A exists)
	B can be written
	B = AAB => conk(B) = rank(AAB)
102914	As the rank of product of 2 minies is less than or equal to rank of either factor
	minices is less than or equal to
TL 5.5	rank of either factor
	Cank (B) > rank (AB)
Adv m	rank (A) 7 rank (AB) (2)
0.0004	A se determined is all .
6	ASA is Invertible making.
ON TO	LI - CANT N.
	to produce the land that
DESTRUCTION OF THE PERSON OF T	It is is knowsen in such way that
* 3	if B is choosen in buch way that (AB) Exists.
	Then Pant of (AB) = n(5)
	and it B is choosen in Such way the
100	as noes not exist then
The state of	winh (AR) teach 1 = (2.
19	from 3 96 sont (13) if the exist
74-	Can F (AI) = out F (A)
	rank (AB) canot defined, If AB not exists.
	east).



6 _/_/3 9.5 And Assume 4+4+2 =0 consider any vector in Spanking as Concor combination of 1 94, i.e.

Very = axtby where 9,46 are scalars Since 1/4+120 = 21=-(4+2) -0 VAY=9x+by = -(9+6)*2 = -(-0+6)y-92 awy vector in span (xiy) can be written as linear combination of y and 2. span(x,y) = span(y,z) -3 Similarly vector from span(1/2) can Where aps are Scalars. ": Vp== ax+ b2 from equ D Vm2 = ax+b(-x-4) Ng2 = x(9-b) -by -- (3) .. any vector from 1/2 span can be Written as linear combination of xxy :. Span (xry) = span (xr2) -0

therefore from equ 3 of equs span (x14) = span(412) = span(42) to arranging the term we get (and the vectors VI, V2, -- vn Span V. This mean that myvector Wearn from

vector space V can be expressed

as unear combination of these vectors .. let take W as W= av, +920, -920, +9303-930, --- Phone where a, a, a, a, are scalar coefficient rewrite the was below w= qui+ q2(v2-v1) + q2(v3-v1) ... 9h(m-v1) This Show Vector W can expressed as linear combination of vectors V11 V2-V1, V3-V1 --- Vn-V1 There fire the vectors V, V2-V1, V3-V1 -- Vn-V, also span the vector space V. D Suppose, there excist scalors
b1 + b2 + b3 -- bn

0

@

Such that.
bivi + b2(v2-v1) +b3(v3-v1) -- bn(vn-v1) Rearranging the term we get (b)+b2+b3---bn)v1+b2v2+b3v3---+bnvn Since VI, V2, V3 --- Vn are Unearly Independent this implies that b2 20 bin = 0 alph (a) b) = $b_1 = b_3 = \cdots = b_n = 0$. which mean that the vectors V1, v2-v1, v3-v -- Vn-V; are also linearly independent 16th Show Victor W can expressed a linear combination of vectors There fire the vector viview, we have VI-VI also spandle vector everys Vi

rector distance which colony