

**NAME abdul wahab I'D 16907**

page yo

az if  $[a_{ij}]$  and  $[b_{ij}]$  are of

Fell eque The same order and  $a_{jj} - b_{jj}$

Then matrix will be del equal 13. Madrix  $[a_i;$

Iman is a sau matrix ifil

sol  $m=1$  Liu. matrix  $[c_{ij}]$  Inn is a reeleinguler if I

fel  $m$ -nto 1 (15) is  $[a_j]$  min is a scalon matring

if: Id (la anolb) ciao Wij mative  $A - [a_y]$  o

is an calentin

$$e_{ij} = t$$

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Which matric can be tectangular

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- page 39

18

if

two

rows

of a determinant

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are

identical

The

its

value is :

if

if

A =

2

0

a

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1-1

is

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matrix, Then Cofactor of u is  
ral- if all the elements of a row or a column  
are Zero , Then value of The delerminant  
is:

fot. Zer value of im for which matric

in is singular.

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Lih:

(5)

page 38 Ans Al wo

of columns in

- A = No of rows in B if The neler of The machines

A is pug and order of B is qar, Then onder of AB will be {c} pry

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th an identity malis all This cliagonal elements are:

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The verlue of determinant are ietental Then lits value

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A is

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The

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An - In A

0.3

Define

Symmetric in

Ans

A square

A square matrix  $A$  is called symmetric matrix, if  $A = A^T$ .

:

a

A square matrix  $A$  is called skew-symmetric matrix if  $A = -A^T$ .

Any square matrix can be expressed as the sum of a symmetric and a skew-symmetric matrix

$$A = \frac{A + A^T}{2} + \frac{A - A^T}{2}$$

A

page 34

Throughout, boldface is used for The row and column vectors. The transpose (indicated by T) of a row vector is a

column vector

Q:8: Define identity matrix.?

Ans

Identity matrix is a  $n \times n$  square matrix with  
The main diagonal of 1s and all other  
elements are 0s.

if A is a  $n \times n$  matrix, Then  
 $IA = A$  and  $AI = A$

Short Questions )

Q. 1

Define

row

and

column vectors

Ans

In linear algebra a column vector or column matrix is an  $m \times 1$  matrix consisting of a single column of  $m$  elements.

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Similarly: a row vector or row matrix is a 1  $\times$   $n$  matrix, consisting of a single row of  $n$  elements.

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$$\text{E} = \begin{bmatrix} -2 & -9 \\ & 8 \end{bmatrix}$$

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valua!

so

page 31

soli.

Let

*now.*

*The*



$$\text{FAR} - 1(0-8) + 1(4-6) + 0(0-8) \\ -8 - 210 \text{ JAL} = -10$$

ads A=

all 247

a3 agt

arg

$$a(80-8) = -8.$$

$$(2-0: 42 \ 362-0) \text{ oly} - 2 - 1(6-4) = -2$$

$$+0-2 = -2$$

$$10-8) = -8 \ 2(4+3) = -79 \ 70+2) - g$$

ass

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Find

of

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The

inverse it  
Following

it exit matrix.

T-1 out

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Let

so

$$|A| = -1-6$$

$$\text{traces of } A = 1$$

HRIN

$A = -A^t$  so

symmetric

so -

it. Also Then  $A$  is called singular otherwise  
is non singular

$A$

Expand by R,  $1024 - 10(-26186.205 - 466 + 16)$

$14 - 2(-2) - 1(10)$

$14 + 4 - 10$

$14 - 14$

S

A

is

*singular*

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EXERCISE which of  
matoes are 1 2 17

24 9.3 page The

Following simpelas of  
non singular

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is

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called

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$|A|=0$  singular

then

Herce

A

$1(1+2) - 3(0 + 2)$  to (ith

$=1-940$

so

A

is

non

singular

solve

use coamer  
system of

neles to  
ervation

$$\begin{aligned}x-y &= 2 \\ x+4y &= 5\end{aligned}$$

sol.

The

Hence the  
coellicients

determinant  
is.

$$\begin{aligned}A1 &= 1 \cdot 1 - 1 \cdot 4 \\ &= 1 - 4 = -3\end{aligned}$$

$A1 = 5$  ex replace  
*IAL with the* - 25 we

the niort edunn

conoesponding constant  
have

8+5 = 13  
(fl = 13 sinlady (Ay) = 13

-3  
2 JA0/= 3

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15

show

That

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sixth curth caxtos

141 AL 43 121224 x (br br  
b3 tlbi be bil  
de ce callch de da

Sol -

Taking

L-H-S

a az az I la, azaz bi bz bz +  
bi beba

ta, az az , ar as Tbi br bst bi be ball Tal  
ca cal 14 de dal L-H-S =  
RoHS

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2 tot (3R/3 4 1 =0

because by

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R, ep R3 are some

*properties of Determinat*

Page 3

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EXERCISE arbol –

Expert ci



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determinant  
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sol:

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(4+)+

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-- 34 - -41

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Expent

by

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x (0 - 07-0 (0-0) 40 (0-0)

to-oto

28B016 87. i 07

Lo il 22 41 1-3 4

- L-4-S

& R-H-I

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atzb+30]

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L3a15b el

Isol. = 2 1 0 57

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Tatib+30 1

I. 3a+sh-c

T-arabt 307

= 12+b sat5b-c. I gatslo.cl

a + 2b +30

7 12+b

L-H-S=R-H-S

(248)6641) = 1:

CR-5)/A:B) 1

Taking

R-HI

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Sol

.R-H-S

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6-8

5+0

1-H-S



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+ 3

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page 4

Sol

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Exercies

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The  
order of the matrix : fans! (0)  $3 \times 1$

@ The order of makixe [123]

As far  $1 \times 3$  3) The motion foolis.  
00

called

Ans

null

Ho

Two are

matrics

conformabe

A and B for multiplication

page 36

Where  $CA+\#)$  is gymmetrie matrix and

$CA-1)$  is skew= symmetric metric

O

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Difine

diagonal matrix.

Ansi A square matrix is called  
a diagonal *mabix* if nandiagona entries are all

Zero The main

diagonal can be constants

or Zero. A diagnol matrix must sit the  
following

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du oo...o o dzzo ...o to o di  
no

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Looo...dan  
page za such That

**matrice Que**

**The Singular**

*Dollowing*  
o K bl  
cis 3

cints 4k  
1-4 2 6

$$3K-24=0$$

$$3 K = 24$$

$$K = 248 \quad K=8$$

Icii

soli- 11 2 -11

- 3 4 K

1-4 2 61 Expend by RI

1(24-2K)-2 (-18 + 4K - 1 (-6+16)

24-2K+ 3b-8K+b-lbo - 10k +50=0

-10k= 50

K=

5

Aug

page 26

2

The  
symmetric

Dollowin  
g

which of mahor is

skey-symmetix.

2 677

$$\begin{array}{r}
 12 \\
 6 \ 7 \\
 A6 \ -2 \ 3
 \end{array}$$

$$2730$$

so

$A = A^t$  so  $A$  is symmetric. sol; if  $A$  is an Then  
i

$$TO \ 3$$

$$-5$$

10

$$43-0-1 \text{ pyl} = 42$$

Similarly

$$\frac{6-7+30}{4+1} - 1(14-15+0)$$

$$\text{Rat} = 24$$

*Here*

$$X = ?$$

HALL

M

The solution

set

as.

$$\begin{aligned} X+Y &= 0 \\ 2X-Y &= 47215 \end{aligned}$$



The determinant *capiticienda*

Expert by R 1-1-8) 1  
(2+4)+1(-4+1)

$$AI = -18$$

We

*com*

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**s**

*Find A delcaminant*  
columnar os 7 we have

Put

*JA107*

Ellena by R. = 0f 16-4-145+28+  
(267)

0-43-23 hx - bb

Sinplasty

*by R*

*1 7 H Exporto (15+28)*

$$+ - 0(2+4+1(14-15))$$

puede 21

Expend by a - (+1+2)

$$4(2-1)+1(4-1) - 1(17-4)$$

$$(1)+1/37$$

$$-1-4+3 A1 = -2$$

a

Expond by

$$164+2)-3(1-1) +0 (2-4)$$

$$2-0 \text{ to } Ayl = -2$$

similooly

a

uff

Expend by a 161-4)-3-1+2+0

$$(1+2)$$

$$-3-3 \text{ to } Az = -6$$

Herc

e

$$X = JAL$$

TAL

$$x - 2y + z = 1$$

$$3x + 7y - 2z = 4$$

$$y - z = 1$$

sol" -

Hence the The  
coefficient

determinant.

is:

-

-2

|

Expend

by a

$$1 = 1 + 2 - 3(2 - 1) + 0(4 - 1) = 149$$

$A_1 = 10$

For 1A

replace

the

column

of  $|A|$

*with*

*the corresponding we have*

*constant -14, /*

page

18

7-

Find

The

value

of

t.

x 10

sol

$$\text{Expend by Rz } *(4-3x) - 112 +x) +0(941)=30$$

$$(4x= 3x2) - (12 + x) + 0 4X-3$$

$$2-12 7x$$

$$-3x+3x-12 = 9-30$$

$$-3C\%* \underline{-x) = -30:42 -3x (x-1) = -18$$

$$-3x = -18$$

0

$$x1=-18$$

- beca

$$X=-18+1$$

page 17

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That

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baca to ath cal

tbtc-3abc

La Edard by

a btc ctbl 16 cabre Jc ath  
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CH480)(bet be Acciactacta') –Chetszczucb) –  
hCbctbacica Catcha baxb) + 6 + bc4cb+co)-Cacta  
abctha) (cc7c tacts ?-  
be?\_Db-cepcha)-be-ba-bebabae

that chiha b't öctbetobtc2-ac-oc-bebec & bc3ebc/ot  
1 Adcbe-25 26  
b6+36 962 4BC454463-04-02-be db)

$$= a + b^2 + c^2 - 3abc$$

-

So

$$1-4-5=R-H-S$$

page 16

gros

show That

Te car la i al = (path) L-a) la all

1

Il a at Taking L-H-S

la a Il Espend by R, 11-02)-a (al-Q2)+ a  
(a2-al) sal - otot dat.

I-az-or-at 1 (1-0) - 204

le-ar-200 : (2il) - 0.2 :

H-S=R-H-S

Lage

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sol

$$A = A.A + B-C$$

4+47

+

3to 14+0

0447

+2

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show That Then  
 $(A+B) (A+B) R$

Lor ABBR

solir

Taking

L-H-5

following

Ta.a4 Solue each of the

*Madrix equations:*

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Sol:



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Subtract

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B-A= :

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Q Noa -

write each sum a single matrix

Lazio

Ans

$$2+6$$

$$2. + 6$$

$$1+$$

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$$13-2$$

H

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13.5 67+10-213

ANG [H0 8-2 5+1 6+3

Abs

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3-2

5+1

6+3

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a

Gi

$B = [b_{ij}]$ , where  $i = 1$  and  $j = 1, 2, 3, 4$

Ans

» 2

3

4

$b_{11} \ b_{12}$

1 13 1 14

Lii)  $C = [c_{jk}]$  where  $j = 1, 2, 3$ .

and  $i = 1$  Ans [ 1 2

3 [ ]

Ans

CI

C 21

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Page 1

## Matrices And Determinants

ID

16 goo.

### T Exercise 91

Q. No. I Write The following

*matrices in lobular form* \* (  $A = [a_{ij}]$  where.  $i=1,2,3$   
and  $j=1,2$ . Bu

*Ans*

اور قره بلادنا فيه باين

all  $a_{12}$

$a_{21}$   $a_{22}$   $a_{31}$   $a_{32}$

$a_{13}$

$a_{23}$   $a_{33}$

an.

24 034 1