

LINEAR ALGEBRA AND ITS APPLICATIONS UE19MA251

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Transformations Represented by Matrices



Integration Matrix:

Consider the integration of a quadratic polynomial from 0 to 1. This transformation is linear which transforms P_2 to P_3 .

P2=
$$\int p(t) = ao + a_1t + a_2t^2$$
, $ao_1a_1, a_2 \in R^2$
Basis = $\int V_1 = 1$, $V_2 = t_1$, $V_3 = t^2$,
 $P_3 = \int Q_1(t) = b_0 + b_1t + b_2t^2 + b_3t^2$, $b_1 \in R^2$
Basis = $\int u_1 = 1$, $u_2 = t_1$, $u_3 = t^2$, $u_4 = t^3$ &
Aint: $P_2 \rightarrow P_3$



Images of 90's are

$$\int_{0}^{t} 4 \cdot dt = \int_{0}^{t} dt = \int_{0}^{t} - \frac{1}{2} \cdot \frac{1}{2}$$



Transformations Represented by Matrices



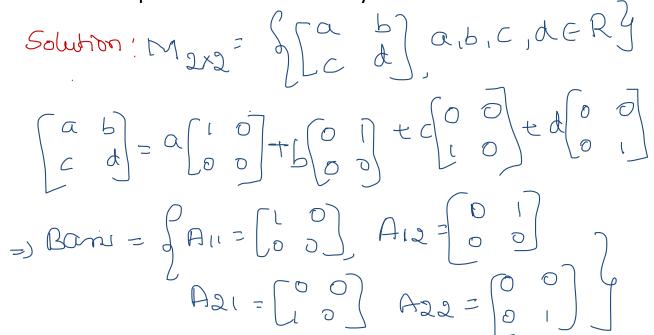
Nose'

- .-> Adiff · Aint I3
- -> Differentiation is a left inverse of integration.
- -> Integration is a right inverse of differentiation.
- -> Glumn spare i.c. range of Aint-is a subspace of
- -> Kennel ce Nulspace = { 0 EP2}

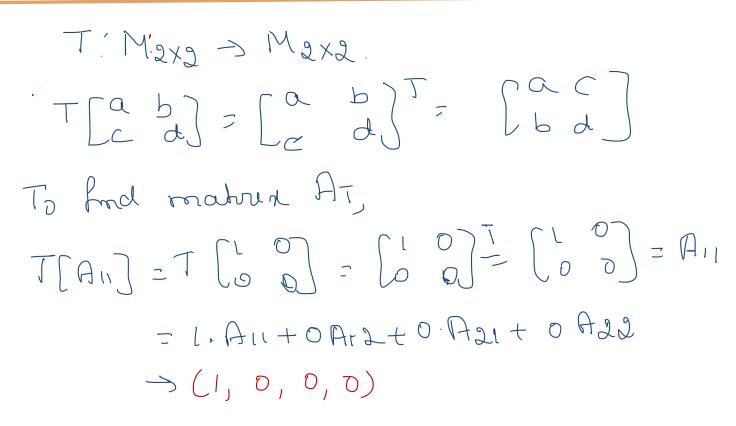
Transformations Represented by Matrices

Problems: •

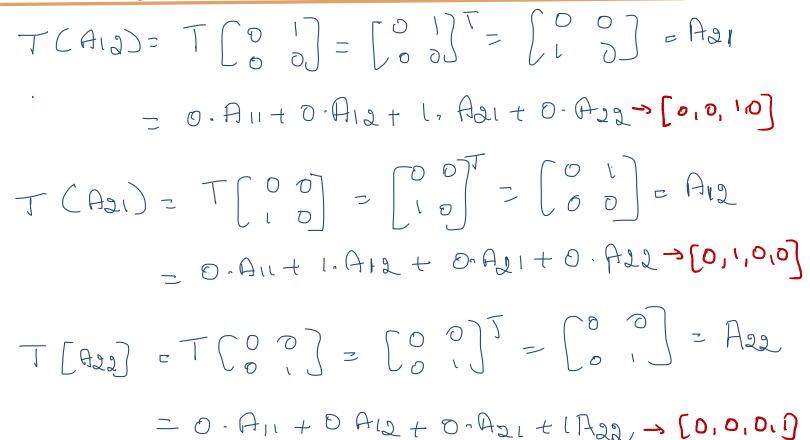
1. For the space of all 2 x 2 matrices find the standard basis. For the linear transformation of transposing, find the matrix A with respect to this basis. Why is $A^2 = I$?



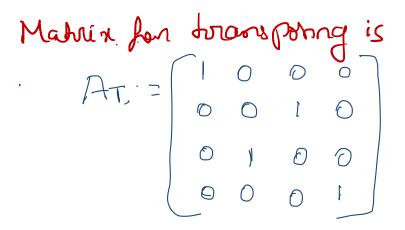






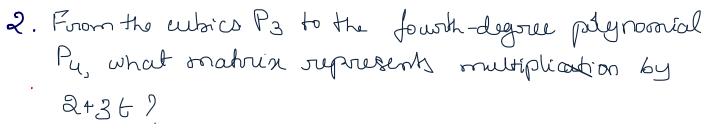


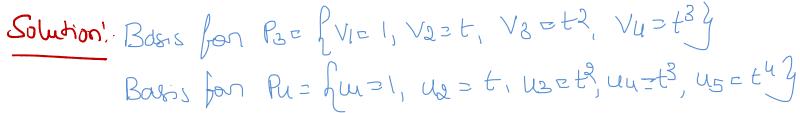






Transformations Represented by Matrices





To find matrix

$$(2+3t)$$
 $2u = (2+3t) \cdot 1 = 2 \cdot u_1 + 3 \cdot u_2 + 0 \cdot u_3 + 0 \cdot u_4 + 0 \cdot u_5 + 0 \cdot u_5 + 0 \cdot u_4 + 0 \cdot u_5 + 0 \cdot u_4 + 0 \cdot u_5 + 0 \cdot u_5$



Transformations Represented by Matrices



Similarly



THANK YOU