

 $x_i = \sum p_{ij} x_j$ i.e X = fIn other words, [X]B = P[X]B' [X]B=P[X]B Theorem 7: V= n-dimensional over F B, B two ordered bases. Then J! inventible, nxn matrix P w entries in F 3 for every vector XET The columns of p are given by $p_j = [a_j]_{B}, j = 1, 2, ..., n$

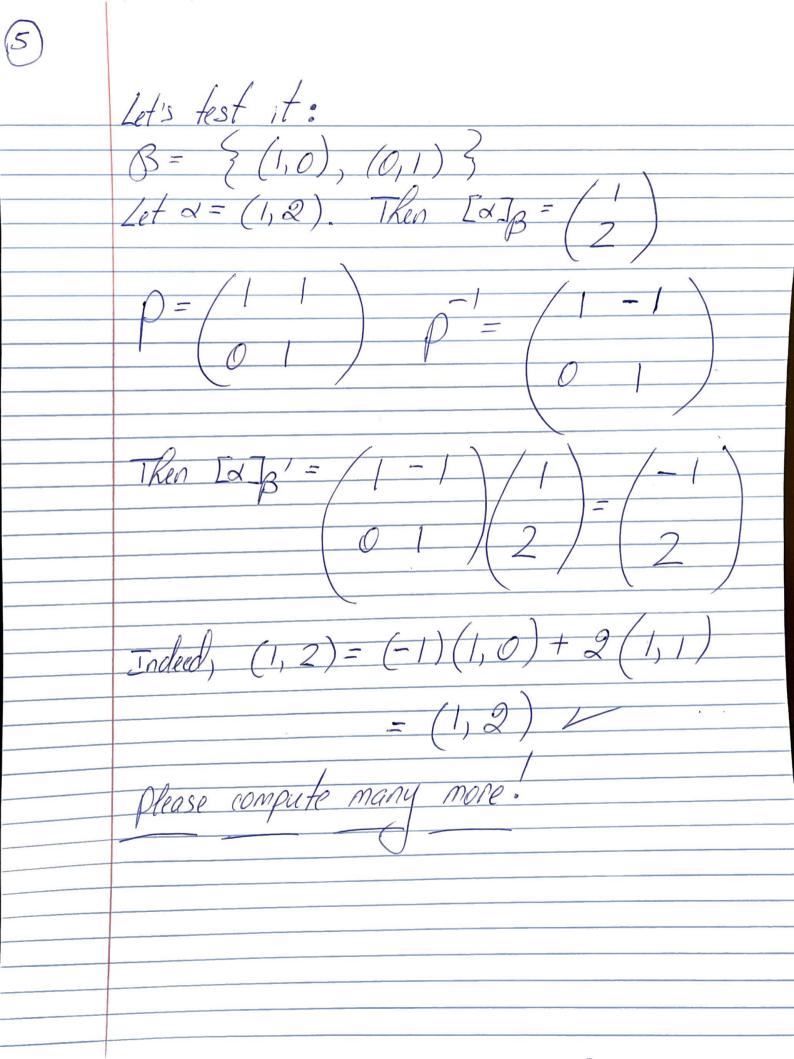
Theorem 8: Suppose that P is AXA inventible matrix over F. Let V be an n-dimensional vector space over F, and let B be an ordered Basis of V. Then I! ordered basis B [X]B-P[X]B' [X]B'=P[X]B Proof: Let B = {\alpha_1, ..., \alpha_n}

1 her if B = {\alpha_1, \alpha_1, \alpha_n} is Casis for which [di] = P[X]B', t To complete the proof, we need that Lis given by (*)

It follows that the subspace spanned by

B = 2 x, x, , , , , , x, 3, and hence egue

So B is a basis and the claimed for Example: $83 = \frac{2}{5}(1,0), (0,1)$ B= 3 (1,0), (1, $d_1 = \sum_{i=1}^{2} P_{i1} d_i \qquad d_2 = \sum_{i=1}^{2} P_{i2} d_i$ $(1,0) = \rho_{11}(1,0) + \rho_{21}(0,1)$ $(1,1) = \rho_{12}(1,0) + \rho_{22}(0,1)$ It follows that PII = 1, P21 = 0 1 P22



Putting all the row-eguivalence notions together. A mxn matrix over F di = (Ail, Aiz, 111) Ain) row space (A) = span { \(\circ\), i=1, 2, ..., n row rank (A) = dimension of the row $P = K \times M$ matrix over F, then B = PA is a $K \times R$ matrix whose row

vectors $B_i, ..., B_K$ are given by B:= Pi, d, + 111 + Pim ~m

It follows that now space (B) C row space (

The prem 9. Row equivalent matrices kaup

The same row space same now space,