

**Tutorial 3**

20/08/2024

1. Let  $V$  be a vector space over a field  $F$ . Prove that it can never be union of two of its proper subspaces. Does there exists a vector space over a some field which is a union of its three proper subspaces ?
2. Let  $V$  be a vector space of polynomials in  $x$  of degree less than equal to 2 over  $F$ . Prove that  $\mathcal{B} = \{1, x, x^2\}$  and  $\mathcal{B}' = \{1, x + t, (x + t)^2\}$  are basis of  $V$  for a fixed  $t \in F$ . Find the change of basis matrix from  $\mathcal{B}$  to  $\mathcal{B}'$ .
3. Let  $V$  be vector space of polynomial over  $\mathbb{R}$  of degree at most 3. Let  $f_1, f_2, f_3$  and  $f_4$  are elements of  $V$ . Then which, if any, of the following conditions is sufficient for  $f_1, f_2, f_3$  and  $f_4$  to be linearly **dependent** vectors of  $V$ :
  - (a) At 1 each  $f_i$  has value zero, i.e.,  $f_i(1) = 0 \forall i$
  - (b) At 0 each  $f_i$  has value 1, i.e.,  $f_i(0) = 1 \forall i$ .
4. Solve exercises 1-7 of page 66 from the Hoffman- Kunze's book .

1. sir said p char will be prime why?
2. how is transformation matrix is defined?

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