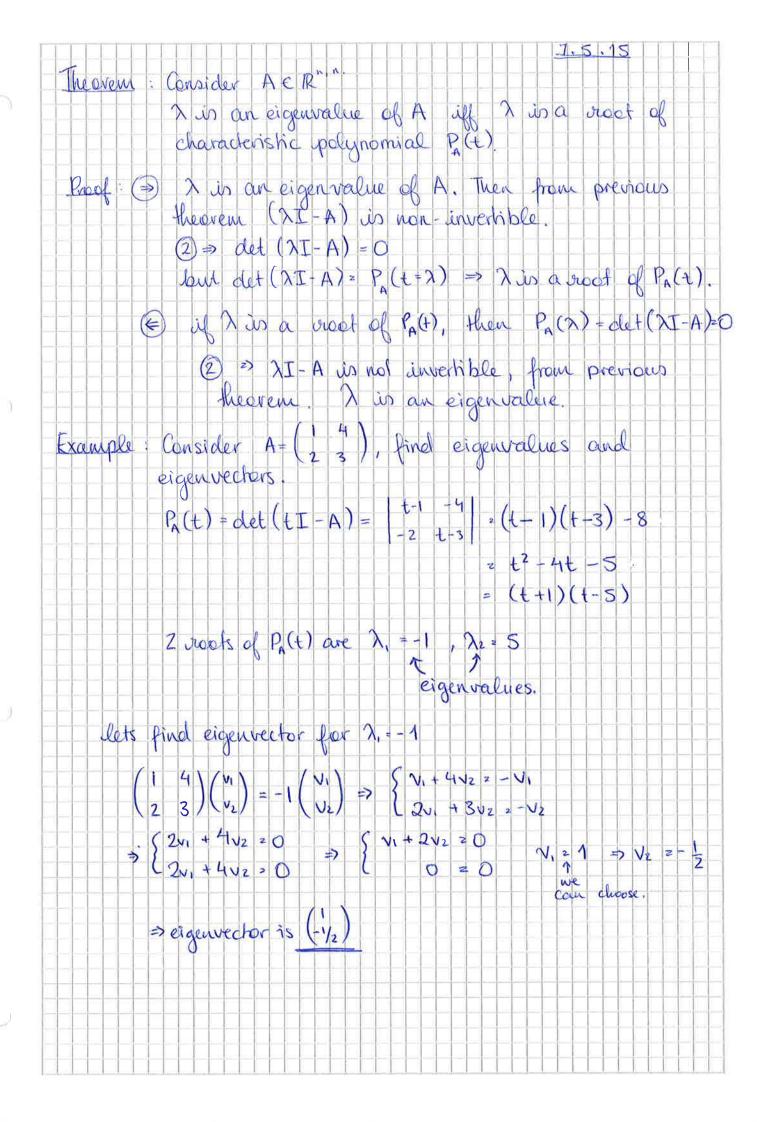
Characteristic Polynomial How to find eigenvalues and eigenvectors? Recall ① lets consider A: V -> V - linear mapping.
A is inversible <=> the null space of A is {0}, N(A) = {x ∈ V, Ax = Q} 2) Air invertible <=> det A #0. Theorem: lets consider A & R". I is an eigenvalue of A iff ( ) I - A) is not in rertible. Proof: "I - eigenvalue of A, IV # Q such that Av = IV  $-\lambda_{\underline{V}} + A_{\underline{V}} = -(\lambda_{\underline{I}} + A)_{\underline{V}} = 0$ :, (XI-A) has non-zero vector v in its null space. O ⇒ (XI-A) is not invertible. V (A-IX) M 3 VE (= slditrovni ton ai (A-IX)  $VX = VA \Leftarrow O = V(A - IX) \Leftarrow$ définition: Consider A C IR ", " Characteristic polynomial is defined as P\_(t) = det (tI-A) example  $A = \begin{pmatrix} 1 & 0 & 2 \\ 0 & 1 & 1 \end{pmatrix}$ ,  $P_A(t) = ?$  $P_{A}(t) = \begin{bmatrix} t-1 & 0 & 2 \\ 0 & t-1 & -1 \\ -1 & 0 & t-1 \end{bmatrix} = (t-1)^{3} + 0 + 0 + 2(t-1) - 0 - 0$  $=(+-1)((+-1)^2-2)$  $= (t-1)(t^2-2t-1)$ 



{ -4v1 + 4v2 = 0 2v1 - 2v2 = 0 clets say we choose v, z1 => vz z

then the eigenvector is (!)