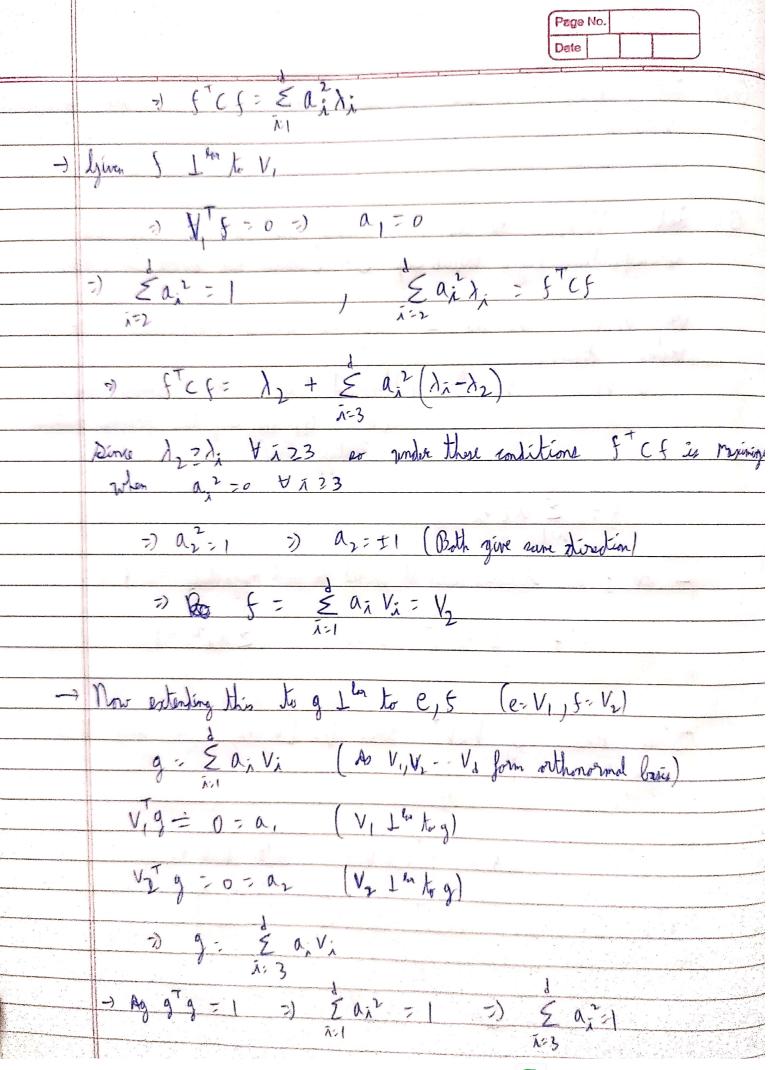
Let V, V2 - · · Vd we eigen vectors and 1, 12 - · 1, we worken of C. (which we sorted in order) As V, V2, -. Vs are I low they are linearly independent, no of V, V2, -- V4 form orthonormal basis of Rd (spectral theorem)
() (Broof in Q, and riving this previous atoterms
justify basis) f= E ai Vi -> As f is direction rector it should be unit magnitude => FTF = 1 =) f f = \( \( \sum\_{\lambda\_{1}} \var{V\_{\lambda\_{1}}} \) \( \sum\_{\lambda\_{1}} \var{V\_{\lambda\_{1}}} \var{V\_{\lambda\_{1}}} \var{V\_{\lambda\_{1}}} \var{V\_{\lambda\_{1}}} \) \( \sum\_{\lambda\_{1}} \var{V\_{\lambda\_{1}}} \var{V\_{\lambda\_{1}}} \var{V\_{\lambda\_{1}}} \var{V\_{\lambda\_{1}}} \) \( \sum\_{\lambda\_{1}} \var{V\_{\lambda\_{1}}} \var{V ftcs = ftv DVTs = (Vts)TD(Vts) V 8 = [v, |v, | -- |v,] T \( \frac{\alpha\_1}{\alpha\_{-1}} \) -) stcf. [a, a, -- a] [\lambda\_1 -- o \lambda\_1 - o \lambd



Page No.
$g^{T}Cg = \sum_{\bar{\Lambda}=1}^{2} \lambda_{\bar{\Lambda}}^{2} \lambda_{\bar{\Lambda}} = \sum_{\bar{\Lambda}=3}^{2} \lambda_{\bar{\Lambda}}^{2} \lambda_{\bar{\Lambda}}$
$ \frac{1}{2} g^{T} \epsilon_{g} = \lambda_{3} + \sum_{\bar{\lambda} = 1}^{d} a_{\bar{\lambda}}^{2} \left(\lambda_{\bar{\lambda}} - \lambda_{3}\right) $
As 12 = 1/4 Viz 4 so gTcg is maximised when ai = 0 Y 1 2 4
2) a3=1 2) az = ±1 (gives same direction)
$\frac{1}{2} = \sum_{i=1}^{k} \hat{a}_{i} V_{i} = V_{3}$
=> We san extend this to Kth being eigen vector corresponding to Kth largest eigen value which is an important step in PCA.