ΤΗΛ 415 - Στατιστική Επεξεργασία Σήματος για Τηλ/νίες Εαρινό Εξάμηνο 2020

Σχολή Ηλεκτρολόγων Μηχανικών και Μηχανικών Υπολογιστών Πολυτεχνείο Κρήτης

Εργασία 2 25 Απριλίου 2020

Αριθμός Ομάδας Εργασίας:

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Επώνυμο: ΜΑΤΣΑΤΣΟΣ

Όνομα: ΙΩΑΝΝΗΣ

AM: 2013030148

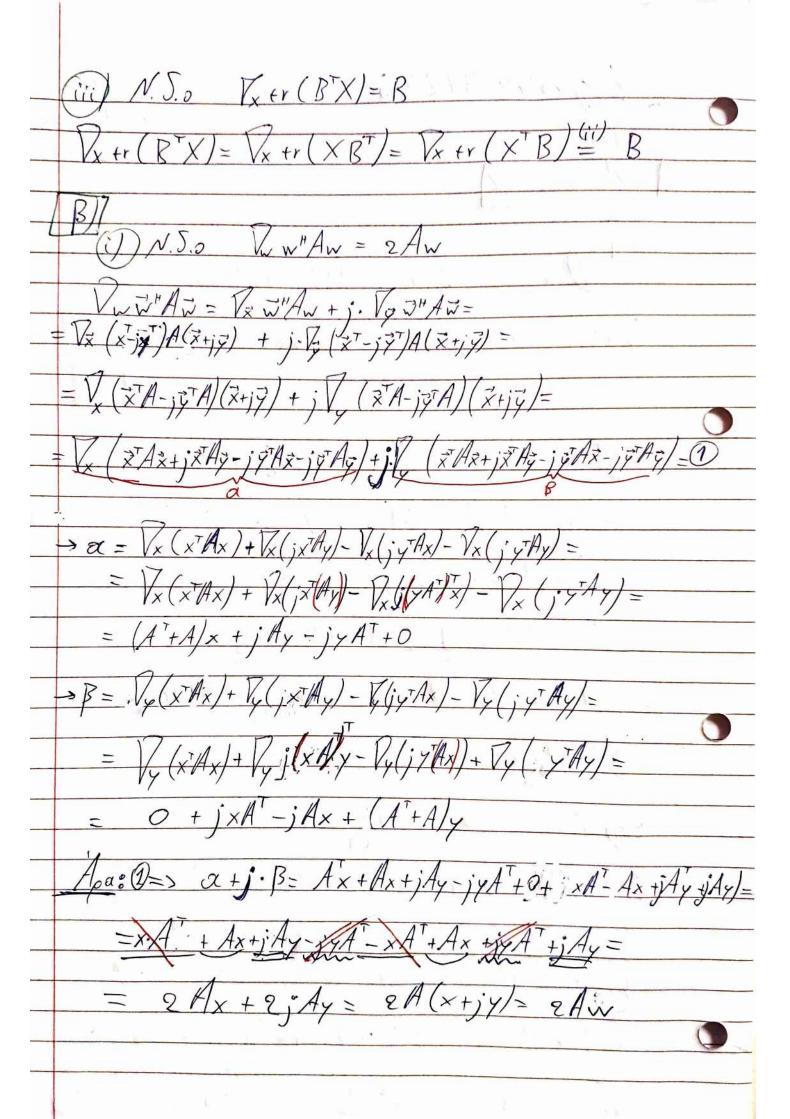
Επώνυμο: ΑΝΔΡΕΑΔΑΚΗΣ

Όνομα: ΑΝΤΩΝΗΣ

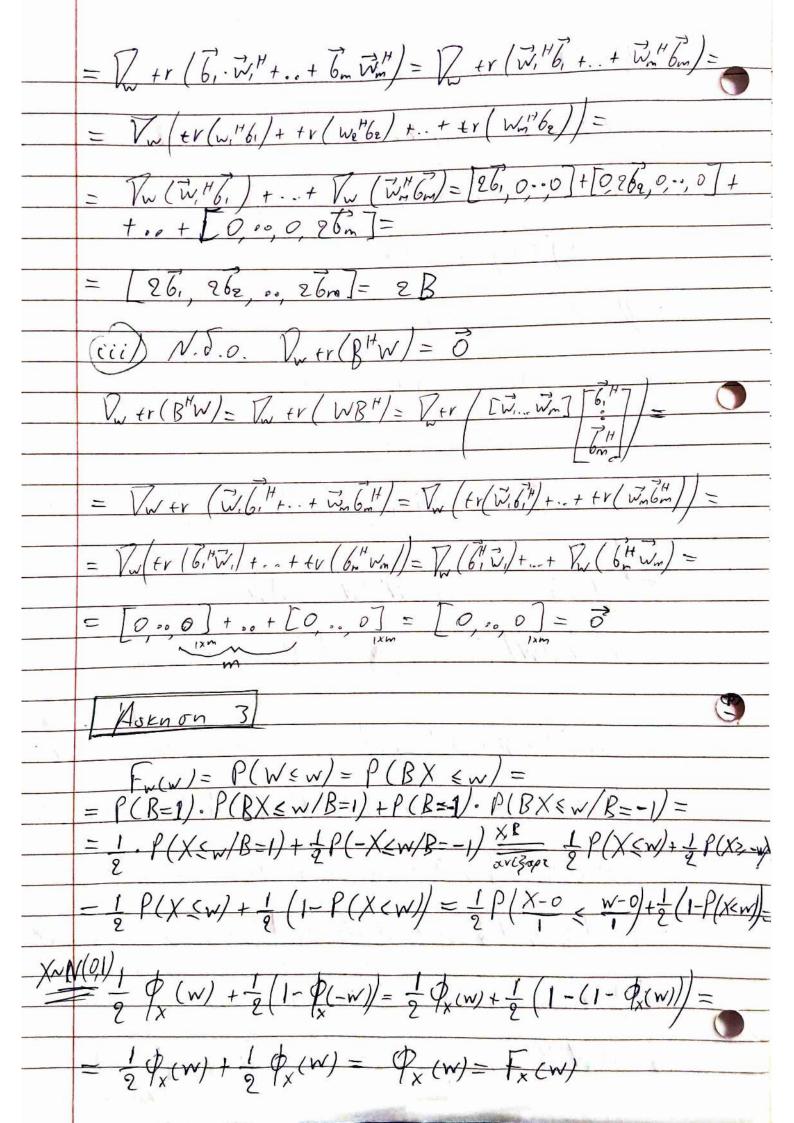
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AM:

pyaviaz-TEL415 1. Marsorsos A-(Z, Z, + ... + Z, Z, T)) = 7 (+r (AZ, Z, T) + ... + +r (AZ, Z, T) x, Ax, + ... + + r (x, Axm) = (X, Axi) + . . . + V (x, Axm) A+A) x, 0, ... + [0, (A+A)x2, 0, ... 0] + .. + [0, ... 0, (A+A) $(A^T + A) \times_2 \dots (A^T + A) \times_m = (A^T + A) \cdot [\vec{X}_1, \vec{X}_2]$ Vx +r/ [6, 69 .. 6m 6, X, T+... + 6m Xm = Vx tr (Z, T6, +... + Xm 6m) Vx (+r(xi6,)+...++r(xm6m))= Vx (X, 6,)+... + VX, T6m) = [6,0,0,0]+[0,62,0,0,0]+...+[0,...,0,6m]=[6,62,...,6m



(ii) N.S.o V, w"6 = 26 Vw46 = Vxw46 + j Vyw46 = Vx (xt-jyT)6+j· Vx (xt-jyT)6= Vx x 6- Vx 3 + 6 + ; (1, x 6 - V, jg 16)= 6+j(-j6)=6+6=26 (iii) N.S.o Vu 6tw = 0 Vn 6" = Vx6" + j /y 6" = Vx6" (x+jq)+j /y6" (x+jq)= Vx6"x + Vxj6"y+; (Vy6"x+Vyj6"y)= $= \sqrt{x(6^*)^*x} + j \cdot \sqrt{y(6^*)^*y} = 6^* + j^2 \cdot 6^* = 6^* - 6^* = 0$ i) N.S.O V +r (W"AW)= 2AW Vw +r(WHAW)= Vw +r(AWWH)= Vw +r AIV...Vm] VVH = \(\tr \left(Aw, w, \mu, + + \cdot + A w w m \right) = \(\left(\xi \varphi \cdot \varphi \varphi \right) + \cdot + \varphi \left(Avk, w m \right) \) = = Vw (fr(w, HAw,)+...+tr(w, HAwm))= Vw W, HAW, +...+ Vw w, HAWm = 2 A w, 0 .. , o] + [0, 2 A w, 0 .. o] + .. + [0, .. , 0, 2 A wm] = 2/ W, 2/ We. 2/ Wm]= 2/ [W, ., Wm]= 2/W (i) N.J. 0 Vw tr (WB) = 2B Tutr(BW")= Vwtr (bi.bm)

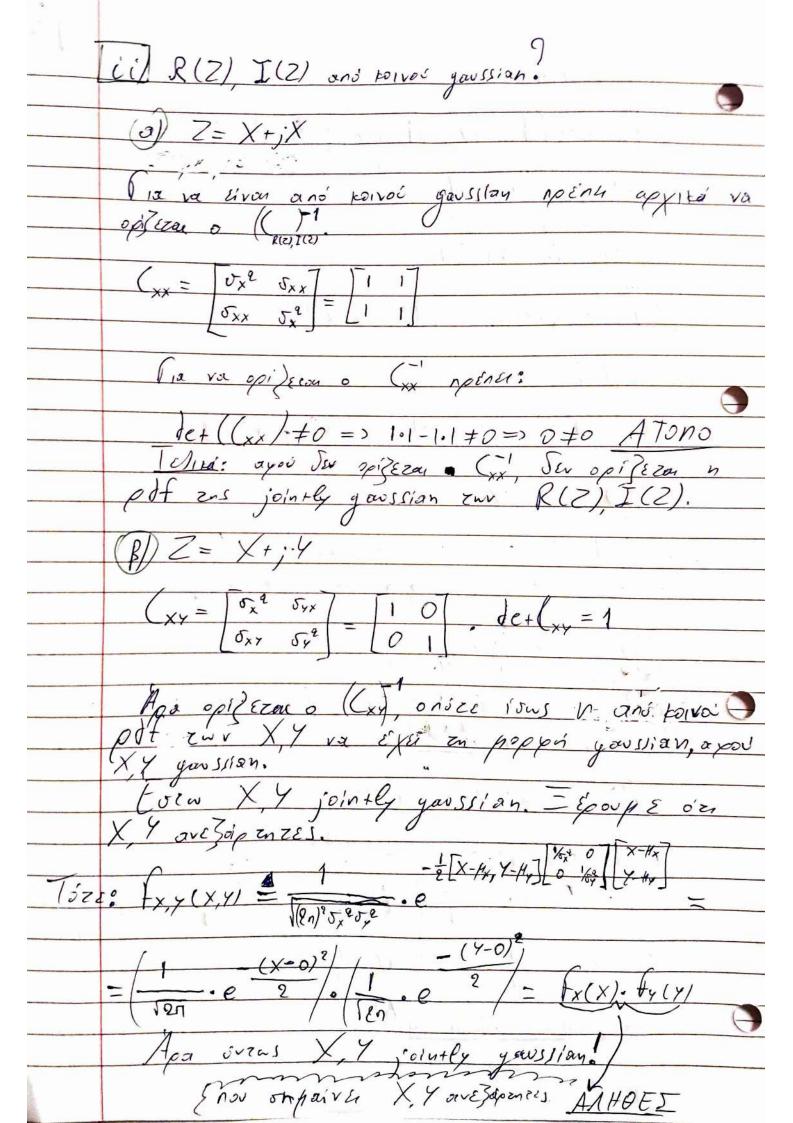


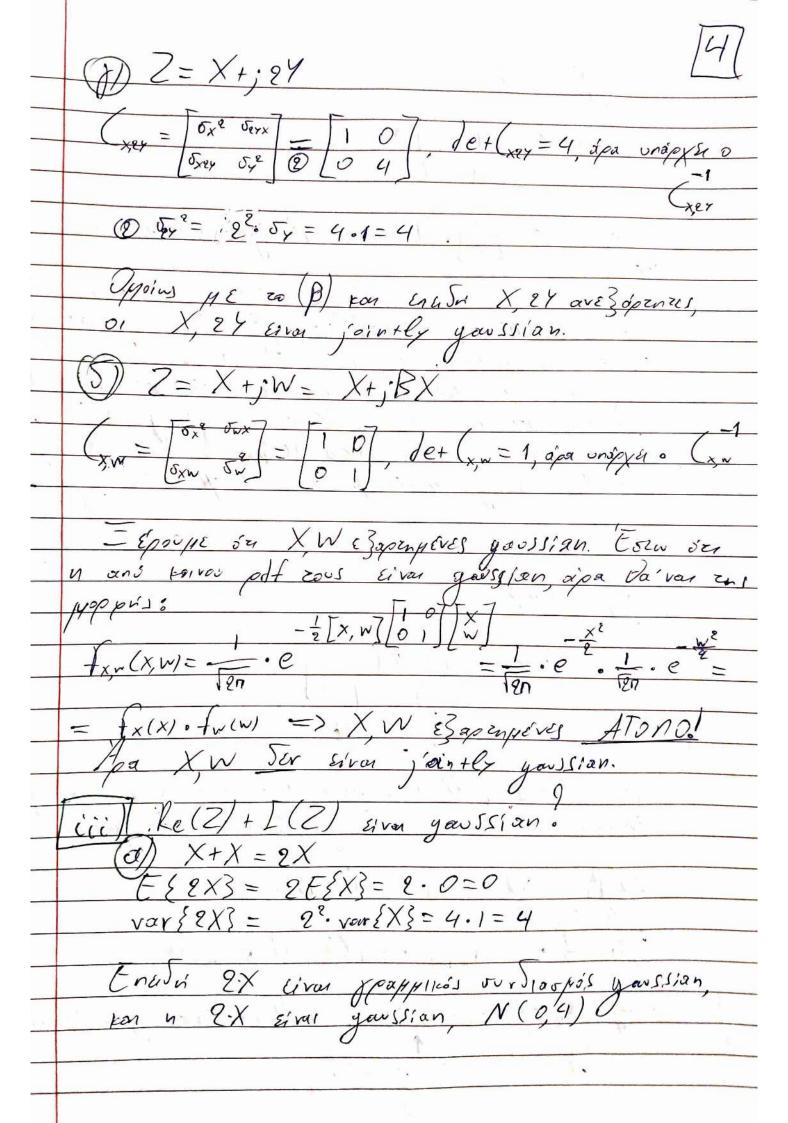
Dapaj wji sovras: fw(w) = (Fw(w)) = (Fx(w)) = (Px(w) = fx(w) = xxx/0,1) 0a W~N(0,1) A sus x i z is z a B(Z) I (Z)? a)) 7= X+j.X $\delta_{xx} = E\{(x-o)(x-o)\} = E\{x^2\} = \sigma_x = 1$ god XX corrolate 2= X+,24 == E{273 = 2E{71 = 2.0=0 {(X-0)(2Y-0)}= E{X.2Y}= 2 t {X.4}=0 J/ Z = X+; W= X+; BX

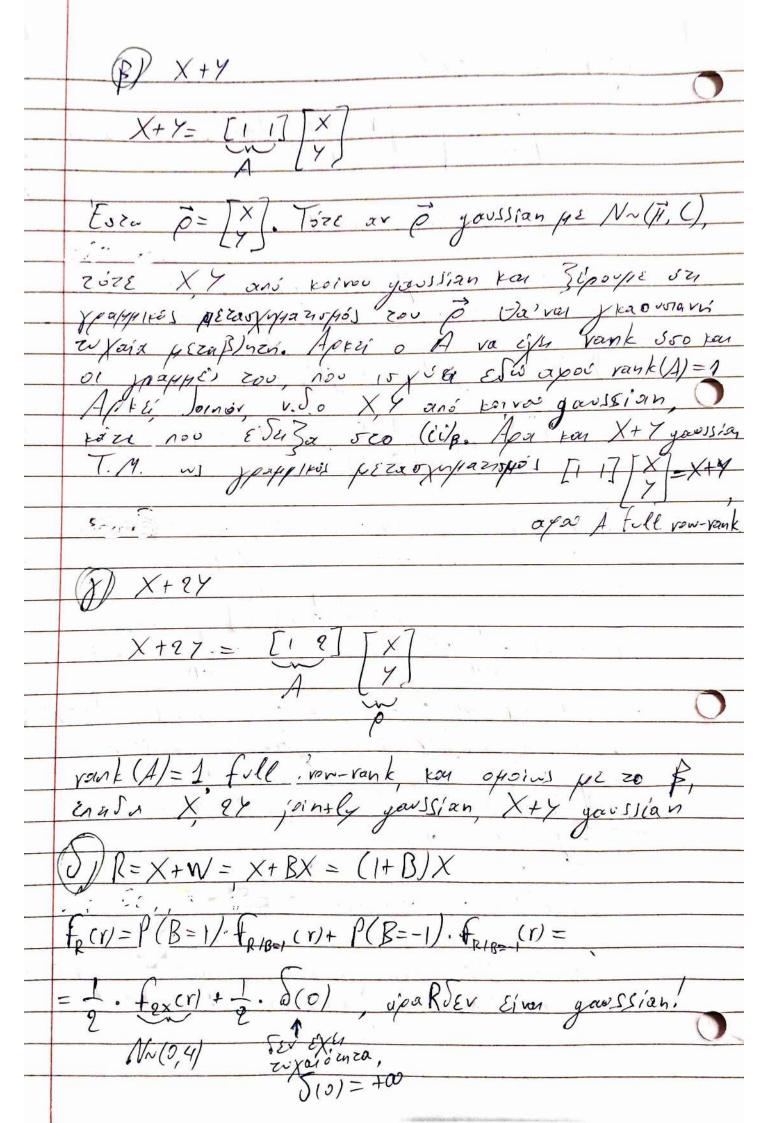
 $\frac{\delta_{XW} = E\{(X-0)(W-0)\} = E\{X \cdot B \cdot X\} =}{E\{B \cdot X^2\} \underbrace{\{X \cdot B \cdot X\} =}_{B,X^2} \underbrace{E\{B\} \cdot E\{X^2\} = 0 \cdot \sigma_X^2 = 0 \cdot 1 = 0}_{C}}$

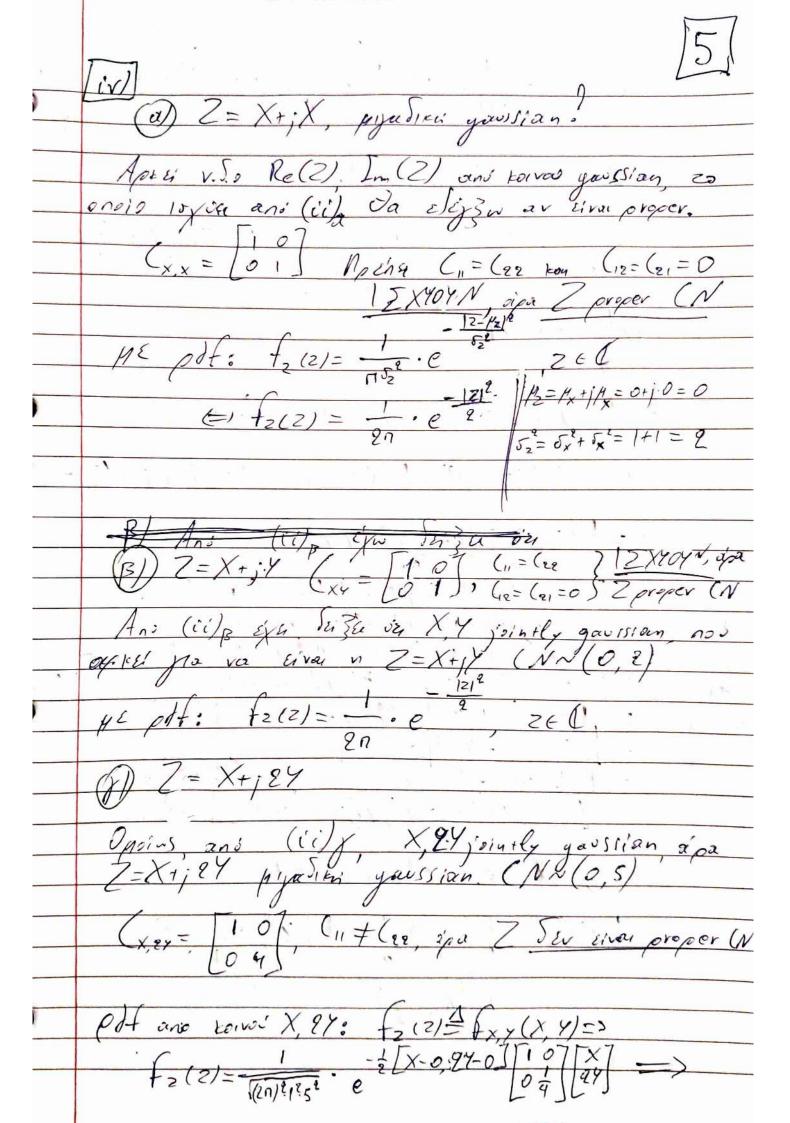
① $E\{B\} = \frac{1}{2} \cdot 1 + \frac{1}{2}(-1) = \frac{1}{2} - \frac{1}{2} = 0$

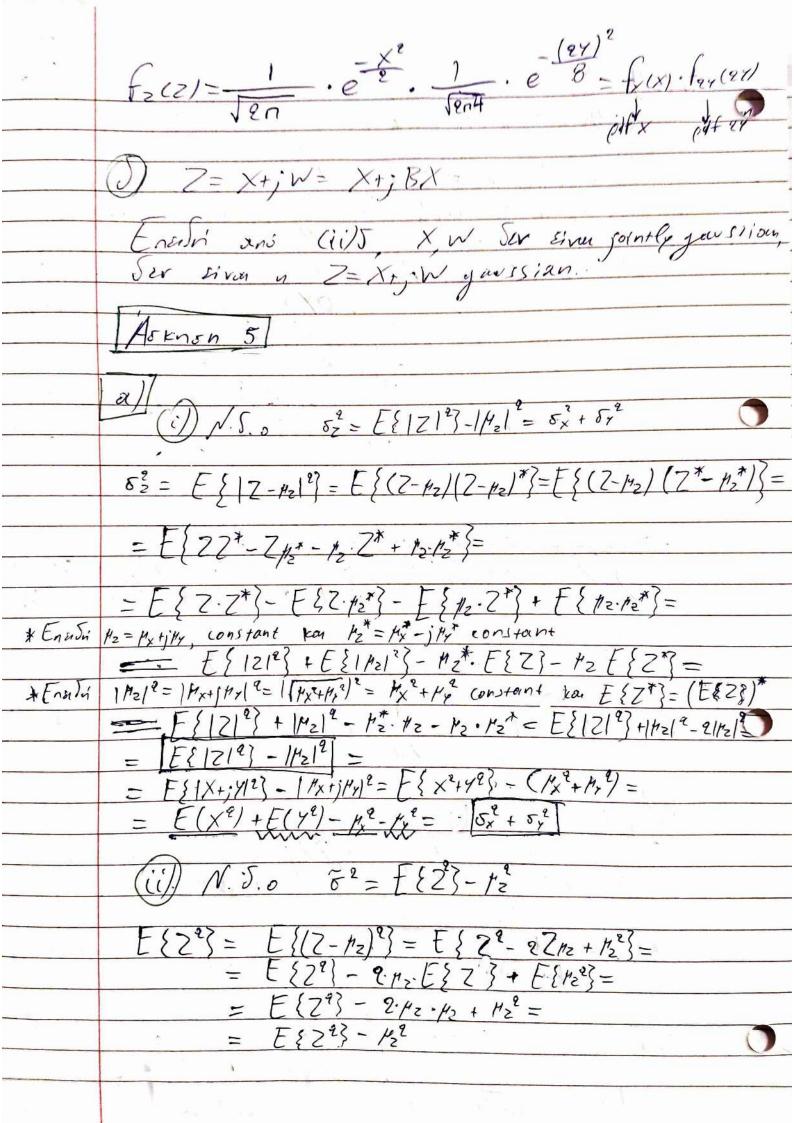
oipa non-corralated!

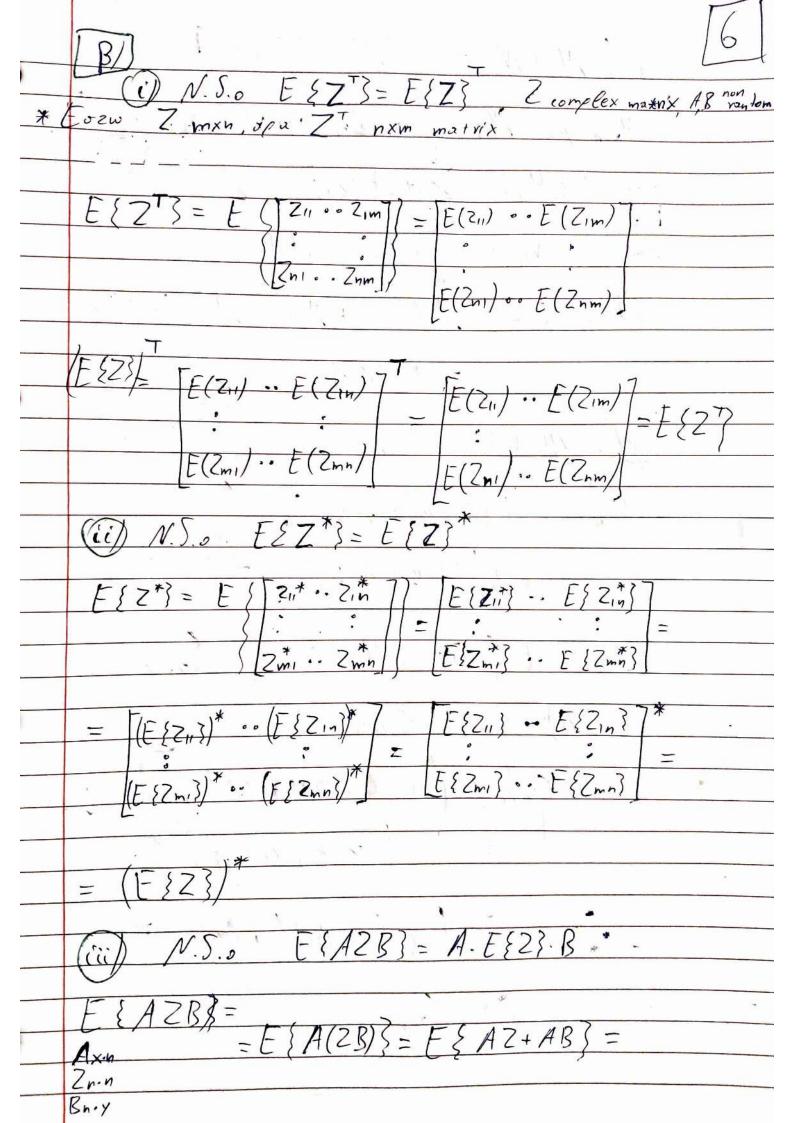












= E{M+N} = E{M}+E{N) @ Mx-n pe Mij = Daik Zkj kon Nx. y pe Nij = Daix Paj kan E{Mi;} = \(\int \alpha i k E{Zkj} = A \cdot E{Z}\) E { Ni; } = Daix Bx; = A·B Tolini (1) => A. E { 2} + A.B = A (E { 2} .B)= (iv) N.S.o (Z,Z,= (H,Z, (E(Z)) = E(ZH) (21,29 = (E) (21-421)(29-422))) H= = E { (Z,-1/2,)(Z,-1/2e) +) + 3 = 8 + A + 1 = E { (Z2-Hzz)(Z,-Hz,) H} = (z2, Z, vi) ... N. S.o Cz, ? = Cz, zz Cz; = (E { (Z, - /2,) (Za-1/2) } = (AB) = BAT = E { (Z,-1/2,)(Z2-1/22) } = = [{ (Z2-/21)(Z,-/21) } =

Hornon 4 a) Ry = E(79)=E((x,a,+x,0,+N)(x,a,+x,0,+N))= = E | x, a, a, + x, a, x, a, + x, a, N + x, a, x, a, + x, a, a, + x, a, a, + Nx, a, + Nx, a, + Nx, a, + NN = = a, a, F(x,2)+a, a, E(x)+a, E(x)+(N)+a, a, E(x)+(x2)+a, + cer E(x) E(N) + a, E(x) E(N) + a, E(x) E(N) + E(NN) = = $a_1 a_1^T E(x_1^2) + a_2 a_2^T E(x_2^2) + E(NN^7) =$ = $a_1 a_1^T \cdot \sigma_{x_1}^2 + a_2 a_2^T \cdot \sigma_{x_2}^2 + \sigma_{N}^2 \cdot I$ $\beta/(x^{T} \cdot \beta_{y} \cdot x) = x^{T} (\alpha_{1} a_{1}^{T} \cdot \delta_{x_{1}}^{2} + \alpha_{2} a_{2}^{T} \cdot \delta_{x_{q}}^{2} + \delta_{N}^{2} \cdot I) x =$ = $\times^{\tau}\alpha_1\alpha_1^{\tau}\times\cdot\delta_{x_1}^{q}+\times^{\tau}\alpha_2\alpha_2^{\tau}\times\cdot\delta_{x_2}^{q}+\times^{\tau}L_1\times\cdot\delta_{N}^{q}=$ = $(a_1 \times)(a_1 \cdot x) \cdot \sigma_{x_1}^2 + (a_2 \cdot x) \cdot (a_2 \times) \cdot (a_2 \times) \cdot \sigma_{x_2}^2 + ||\vec{x}||^2 \cdot \sigma_{x_1}^2 =$ $= \delta_{x_1}^2 \cdot (\alpha_1^T \cdot \chi)^2 + \delta_{x_2}^2 (\alpha_2 \cdot \chi)^2 + \delta_{x_1}^2 (||\vec{x}||^2) > \delta_{x_1}^2 \cdot ||\vec{x}||$ 1 1x1 real 1 1x1 real 1 1 1 7 70 70 70 70 -XII Η ιδιόζη κα λέω, σ'ω: Αν βρ symmetric => x βγx > λημ. 112112

Αρκε: ν.δ.ο βρ ρ.δ.δ, που από (15) δείξαμε σ'ζι: XT. Ry. X > 5N2. 11×11 20 +XER" => Ry sivar p.s.d, Englis Ry nxn. SAS. zezpejwrirós kar $\frac{\text{supperpises: a post } R_{y} = \left(\alpha_{1} x_{1} \sigma_{x_{1}}^{2} + \alpha_{2} \alpha_{2} \sigma_{x_{2}}^{2} + \sigma_{x_{1}}^{2} I\right) = \\ = \left(\alpha_{1} \alpha_{1}^{T}\right)^{T} \sigma_{x_{1}}^{2} + \left(\alpha_{2} \alpha_{2}^{T}\right)^{T} \sigma_{x_{2}}^{2} + \sigma_{x_{1}}^{2} I^{T} = \\$ = a, a, t. 5x,2 + u, azt. 5x,2 + o,2. I = Ry

10x:6 n *D ka will on Sizape oro

za napanáviv, or 15,0 zypes zov. Ry svan Las real. Ry = 1. \(\frac{1}{4.71} + \frac{1}{12.72} + \dots + · 9.97- 1. UZ $V = \frac{1}{k} \cdot V \cdot \Sigma^2 \cdot V$

De Ar στο (3) χια Ry estimation χρησιροποιώσουρε λιγώερα από η διανύσματα (κενή ο βγ
θα είναι χινομένο ε πινόκων 9=[Ϋι...Ϋη] και Ϋ΄ ο
καθένοι με νοπέ ε η άρα · γαμκ(β) ε η αμού
γαν κ(AB) ε min (ναμκ(Al, νουκ(B)). Οπότε καίποια λί
είμεν ναθε θα είναι μη δεν και έξοι: (19 K<n, 1Ry = 17 li = 1,0/2 .. li. 0.0 = 0 Ar Ry full rank, zore KTini, apa n Sizkelvousa: 1 Ry = Mi = 110 /2.00 /n = 01. 5200 00 = => 1Ry = (0, 82 03... on) 2 1 Elika: 1 | 0 | KCh | Ry | = 3 | 5. 52. 5 m) 2 | K7 h