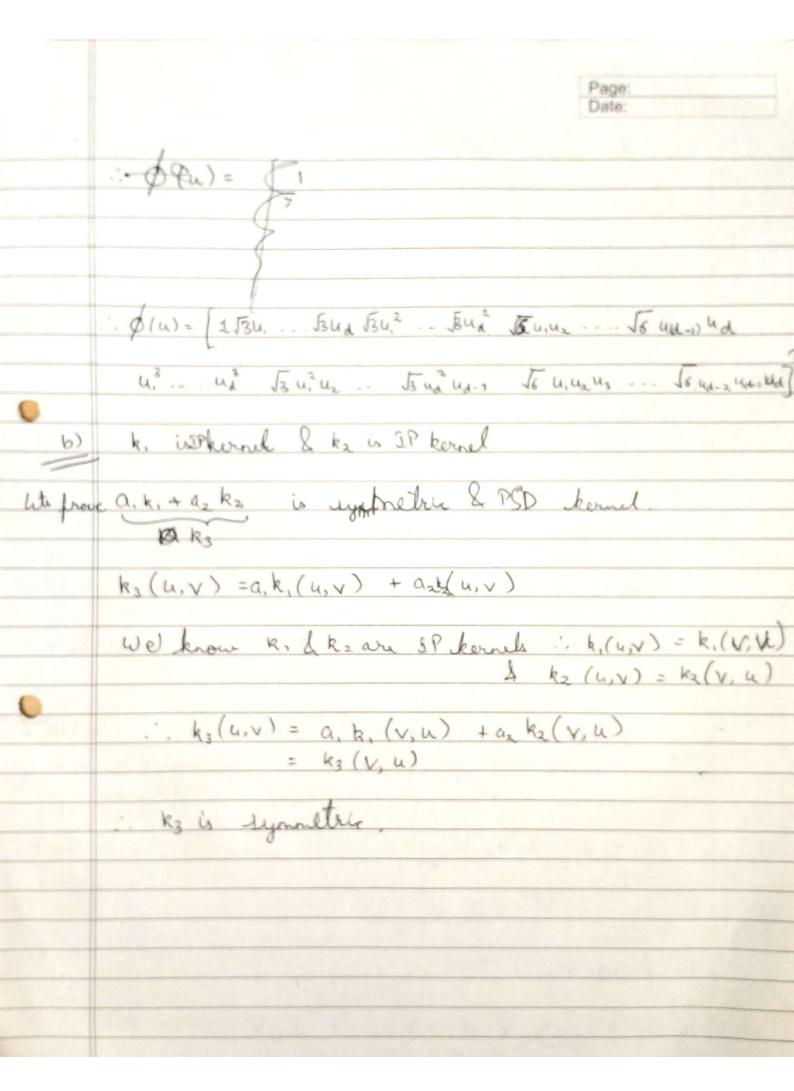
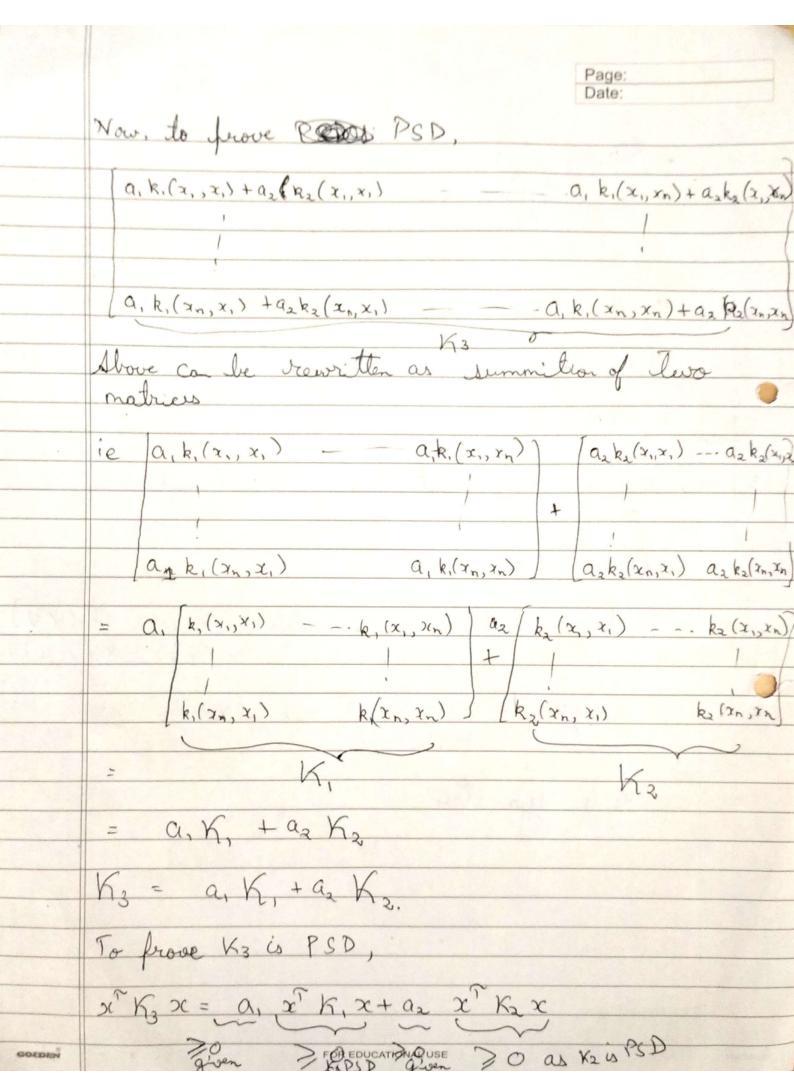


A (1.5%)	
	Page: Date:
0	· If y: (o x:) < 0 If y: (o x:) > 0
	$u_i = 0$ $u_i = -\frac{y_i}{n}$ $u_i = -\frac{y_i}{n}$ $u_i = \frac{-y_i}{n}$ $u_i = \frac{-y_i}{n}$
	$u_i = \begin{cases} 0 \\ 2\lambda & 0 \\ 2 & 1 \end{cases}$ $u_i = \begin{cases} -\frac{1}{2}i / n \\ -\frac{1}{2}i & 2i \\ n \end{cases}$ $u_i = \begin{cases} -\frac{1}{2}i / n \\ -\frac{1}{2}i & 2i \\ n \end{cases}$
1 ~	
(1)	The enfirical rate of convergence is faster for stochastic subgradient nethod relative to the sub
	gradient method because sub gradient took ~35
	applies to coverges where stochastic sub
	gradient method because sub gradient took ~35 of cipelis to coverges where stochastic sub- gradient took ~ 25 chycles to converge.
03	
(a)	$K(u,v) = (\langle u,v \rangle + 1)^{3}$ $= \langle u,v \rangle^{3} + 1 + 3 \langle u,v \rangle^{3} + 3 \langle u,v \rangle$ Atoms
	= < 4, v > + 1+3 < 4, v > +3 < 4, v >
	∠u, v> = u, v, + + ya va. ■
	$\langle x_i, v_i \rangle^2 = \frac{1}{2} 1$
	= > > Ui Vi Uj Vj
	= 4, 2, 2 + + 4, 2 v2 + 2 4, 42 V, V2 1 + 2 4, 42 V, v2 1 + 2 4, 42 V, v2 1
	deturns d(d-1)
	$\langle u, v \rangle^3 = u_1^3 v_1^3 + \dots + u_d^3 v_d^3 + 3(u_1^3 u_2 v_1^2 v_2 + \dots + u_d^3 u_{d-1} v_a^2 v_{d-1})$
	dterms d(d-1) terms. +6 (4,4243+ + 4d-24d-24d-24d, Vd)
	+0 (4,42 43 + * *d-2 4d-1 4d Nd-2 Vd-1 Vd)
	$\frac{d(d-1)(d-2)}{31}$
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10.5	
	Page:
	Date:
	er K3 is PSD
	or K3 is PSD
	kz is symmetrice LPSD => kz is an IP kernel
c)	k is inner product kernel.
	$\therefore \langle a, v \rangle = \langle v \rangle $
0	& < 4, u > > 0 -(2)
Jo lam	a'. Symmetric.
700	o + 5 gmmetree.
	$\langle x_1, x_1 \rangle \langle x_2, x_2 \rangle - \langle x_2, x_n \rangle $
	$\langle x_2, x_4 \rangle$
	6.
	$\langle x_n, x_n \rangle$ $\langle x_n, x_n \rangle$
	$^{\circ}$ $(x_2, x_1) = (x_1, x_2)$ (from frontity (1))
	i. R is symmetric.
	i. R is sympetric.
To I	rock PSD
1	14, [(2x,,x,) (x,,xn) [y,]
	(yn) !
	$\langle x_n, x_n \rangle$ $\langle x_n, x_n \rangle$ $\langle x_n \rangle$
	[y,] [(x, x,)] + + yn ((x, xn))]
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= y, y, <2,, x2> + y, y2 <2,, x2> + yny, < xn, x,> + + yny2 < xn, x2> +ynyn < xn, xn> + り、りのイスカスへ> = $y_1^2 \langle x_1, x_1 \rangle + y_2^2 \langle x_2, x_2 \rangle + \dots + y_n^2 \langle x_n, x_n \rangle$ + 2 y, y > < > (nt, xn) + - - - + 2 ynyn-1 (xn, xn-1) Now, whose k is symmetric, & the diagonal values are 20. . k can be swritten as K = UNUT & K is PSD iff 7: 70 for each i 8 3° we know that the diagonal elements of k are [(xi, xi)]; > 0 { using freferty() .: the eigenvalues of K > 0 or Kis PSD.