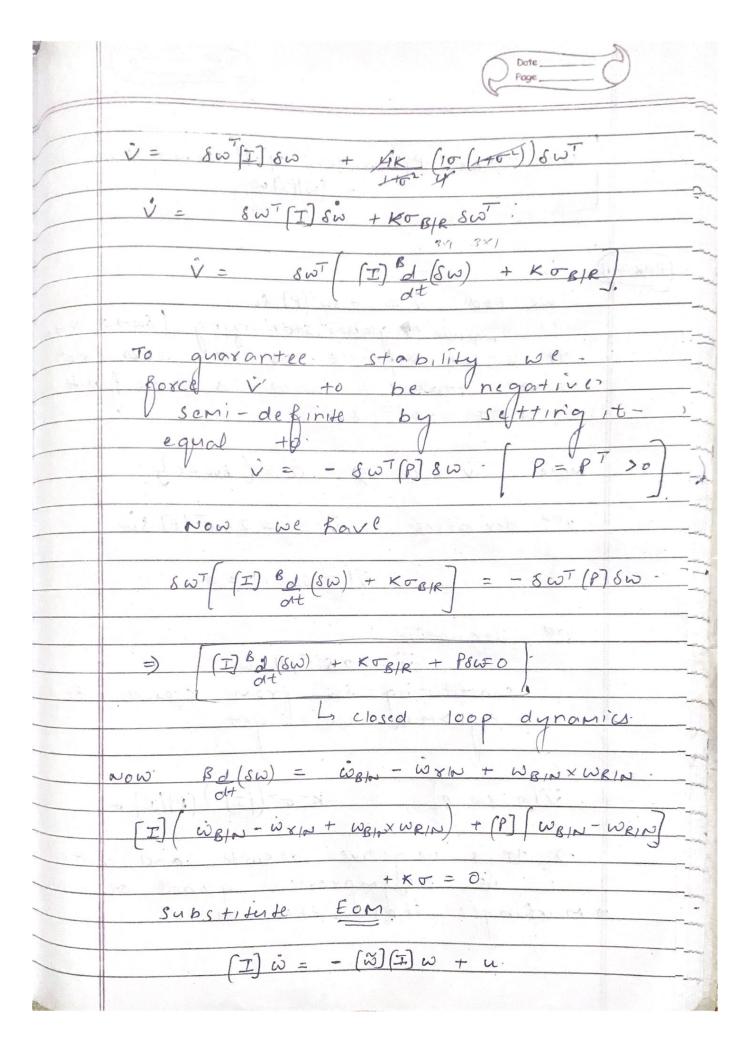
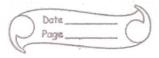
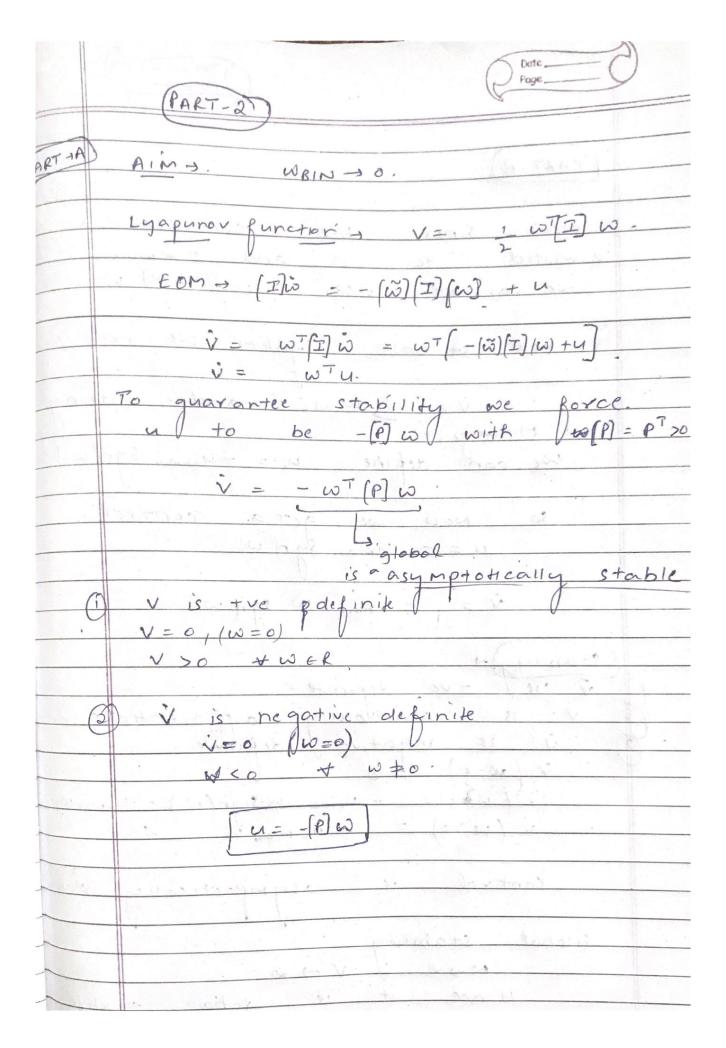


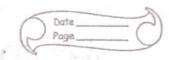
PARTO	States -) SW= WBIR = WBIN- WRIN . , GBR - GBN- GRN Groat:
PAKISI	SW -> O
	Motions of equation : I[iv] =-(iv)[I] w +u
	Lyapunov function $V = 1 \omega^{T} \Sigma \omega + 2 \kappa \ln \left(1 + \overline{\sigma} - \overline{z}\right)$
10-11	2 Rere w is (WRR)
	differentiate stis body frame derivative
	Lyapunov function $V = 1 \text{ w}^{T} \text{ZW} + 2 \text{Kln}(1+\overline{\sigma}^{T})$ 2 differentiate Pere w is (WBR) 4 9+ is body frame derivative $V = 8 \text{w}[I] 8 \text{w} + 2 \text{K} I \times 2 \text{v}^{T}$ $(1+\overline{\sigma}^{T}\sigma)$
	$\dot{V} = S\omega^{T}[\underline{I}]S\omega + \underline{4}\kappa\sigma\dot{\sigma} \qquad \qquad \left(\sigma^{T}\sigma = \sigma^{2}\right)$
	$ \vec{\sigma} = \int_{\mathcal{H}} \left[\mathcal{B}(\sigma) \right] \delta \omega $
	$\vec{\sigma} = \frac{1}{4} \left[(1-\sigma^2) \mathbf{I} + 2(\vec{\sigma}) + 2\sigma \vec{\sigma} \right] \mathcal{S} \omega$
	Scales
	Mutiply by or both sides we get.
	$\sigma \dot{\sigma} = \frac{1}{4} \left[\sigma \left(1 - \sigma^2 \right) I + 2\sigma \dot{\sigma} \right] + 2\sigma \dot{\sigma}^{T} \sigma \left[\delta \right]$
	$\sigma \sigma = 4 \left[\sigma \left(1 - \sigma^2 + \sigma^2 \right) \right] \delta \omega^T$
	5 = 5 (1+52) 8 WT





	Page
	U = -KOBIR -P (WBIN-WRIN) + [I] (WRIN - WBINXWRIN + [W](I) W.
[PART-	B) was on the Canada La Cara Cara Cara Cara Cara Cara Cara
	We Rad $\dot{\mathbf{v}} = -8\omega^{T}[P] S\omega$
	negative of global stabilizing (Sw > 00 v > 0) 9+ is seni-definite as it does not
	Lave states and is definite
	W. 8. t to Swin
105	Note v = 0 = -2 = { sw=0}
- La	
	2 nd derivative $\vec{v} = -28\omega^{T}(P)S\omega$
1 1014	$\tilde{V}(\sigma, S\omega = 0) = 0$
	3rd derivative
	$\dot{V} = -28\dot{\omega}^{T}(P)8\dot{\omega}$
100	· substituting sw from closed 100p
	dynamial we get.
-	2 -/5 -7/5 -7/5
	$V(\sigma, s\omega = 0)$ = $-\kappa^2 \sigma^7(I)$ (P)(I) σ
	=> 9t is negative definite and control
	mukkingée eftr. Heoreti
	vi acceptante a contrata





	(PART-B)
	Now since the control is
	limited to o' and + umax
	ue cannot use. u=- (P) w.
	For stable system we reed is .
10 P 20	to Minimize it
	we can define $u_i = -u_{inax} \operatorname{Sgn}(w_i)$
	so Now we get a control.
	$u = - u \max \log n(\omega)$
alm.	V V
	v = - u max w sgr(w)
	(Stability)-
<u>(</u>	V 1st +ve definite.
	V is contribusing différentiate voit
	v (20=0) = 0
	v (wio) = - uimax w. sign(w) = uimax wzi
	v (w>0) = i u i monx w 20.
	control is asymptotically stabl
	Global Stability
	$\omega \rightarrow \omega$ $V \rightarrow \omega$.
	Hence it is gobally stable
	, V

