

µāÇá Óyó ÓÑ# SéÑ# Óyú# úy#

!> *U ç g , . / Ç ; 7VE&C CWÔ c 0f*' -A/£

Ü È3İ wó - ÷ wÄ I

%Z * !>7VN =y " K• N =y - \ " K•" -lv œ ß !@

...œ@Áµ &!>*U ç g ì 6*Dª8πG ÷ : o(Ü° 8 , . \ 8Ž¹ 7VE&C CWK wð*UgKl2(4 Ôc)3
@ç Õ . C CWK - < C Ì)3 w@@İ³ - .ú!>*U ç g ² C(Ü3 o Ôc 0f*' w 3 X Ě(Ý² (Ü , . /
Ç¹ C(Ü7W> C CWÛ 6* wE 59? à(Ý6 ç g T80! N, C+±Ôc u É £ C¹ 7VE&A 4gKπ ,
,L4 É=• ; wmfð*U+±3 o3ñ5 Ôc 0f*' @î ç g N =yDð8+±ã . / Ç¹ 6 u+±7VE&C CWÛ
Ó wπ 6D*P +±K (ÜQçy T w6 Ö » - ðP u A7 Õ C+±>*U ç g 2(4 N =y Ôc 0f*')

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> E xÖ%

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. ¹ z4) Ôc π 67œª +±u É %Kus|0vç °4 5
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!ö0vç °& ç g g ÖN =y7VE&C CWÛ(4 +±² (Ü
Fð*UL<3i T Õ . E3æ" "C(ÜFð*UE3Õ È " z Nµí

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7E -A/£ ý ' +±Ôc æ" F* Ä ³ Dªª +±Ôc u
É"s \ µ & Dªg7 CØ • C¹ CF Ÿ • mS '
+±=ÖÖN, CK MÅ50;~ : Bà"€Dª8πG C C*y
Ÿ : -> Ç T 2M Í # ú 3) 7!C CWK È T %
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4 ' ³ - .ú 7VE&C CWÔ c æ" % , ,L4 É=• ; m@ë
@İ±² C(Ü Ôc 2(4 6* L Ôc ç g C CWL H+±7W
E&" Ä ³ Dªª +±Ôc u É %

Ö† ç g 2(4 ' N

ÖÖ† L<3i T N , ; , ,L N , Z '
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K MÅ" \ ' /ø ç g DýÕ+± " N , "Ö" (< G €
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W>ýDýÕ % W7 *^ Ó+± ç g DýÕ 3 = 03ñ á
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c/l L ÄO! ßK K0

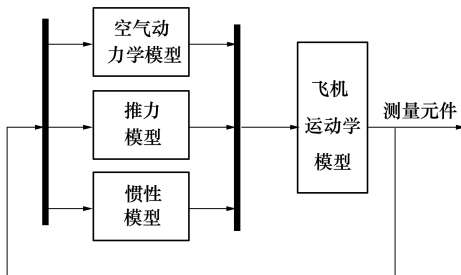
' FpMi, Á" ä7 &çp " ' Fp>7Vø• 5 ' Fp%o ß" ß@; Z * !>7VN =y " K•p-A H Ý KLMI, %H0! ß K0 çBqÖ
%520- ø ÄÜ È3İ wó ßö oZ * !>7VN =y " K•@ß "h>@ü , /§ ZM*7W&Ý) 7WA/£ %

Õ %3â>DýÕ 2 X ß W>ÿ ÓDýÕ 1 0 Wßi DýÕ "59
 Ô>DýÕ 6 0 W>ÿDýÕ 1 ß Wßi DýÕ %& » 1 >3i
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 &" + ß m.g E = y N , , Z ' " , , L ý , !>*U ç g
 ÈKrN = yã . %



+ ß ce ç g N = y , , L N ,

m Z ' ±±š 7 * ^ ÓL<3i T N , æ/8 " = • g
 g - 8 EGU ± ± L<3i T'ã . æ/8 á

$$\dot{x} = f(x)u$$

$$y = g(x)u$$

< Z "x g2(4 'ã . Fù "u g2(4 DÀ' 'y g2(4 Fù
 "xDÀ' 'f gL<3i T'ã . æ/8 * • "g gL<3i TDÀ'
 æ/8 %

Öž † 3â > 3i T C 1) 3

* ^ » ç g ±±š 7 * ^ ÓDýÕ æ/8 Z m 6 DýÕ ï
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 = β " p " r " φ " ψ Ò " Ô c Füg â = δ_a " δ_r " Ò " £ Z v = •
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 . g N g 4 g ∈ x D i 1 z D i ± ± D T C Ô > ÿ ELÓ " φ 1 ψ 3 X
 = • g \$ D T y 1 | 7 W y β = • g Ô # p > ÿ δ_a = • g œ 5) 7 b
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Öž † g K ! 2 (4) 3 @ ç ç g g K ! N ,
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 AŽ N , ï • ± ± C 1 C F • Ô 0 v " û) 3 @ ç @ ß
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 , 8 % o g K ! 2 (4 " û 59 V * U g K ! 2 (4 Q ç Ö c æ
 " 1 = & ç g ± ± Ç Ô c ' N % 6 & " 7 - < T 3i
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$$\dot{x} = Ax + Bu$$

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 Kb " B â t^n x^n g Ô c - Kb " u â t^p g p 4 ! Ô c DÀ' %
 59 - Kb A 1 B ü E g 8 E g K ! • < á

$$A \hat{a} N P^T Q \hat{O} B \hat{a} N S^T T \hat{O}$$

< Z " P " Q 1 S " T 3 X g 2 (4 - Kb 1 Ô c - Kb ± ± 7
 * y 1 8 * y %

f › ý < , ç g N = y ± ± h > @i @ % % æ E 6
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 O 1 @ î Y T m ý g K ! 2 (4 Ô c • @ @ î æ " " " i @
 % æ 5 a N = y ELÓ g !] ð " N = y P Ó g " ! !] # @ % æ
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$$A_B =$$

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$$B_B = \begin{bmatrix} -0! "x & " 0xx \\ -\beta ! & x0 & . 0x" \\ -\textcircled{R} \beta \textcircled{R} & - . \beta " \textcircled{R} \\ ! & ! \\ ! & ! \end{bmatrix}$$

$$A_0 =$$

$$\begin{bmatrix} - ! \textcircled{R} & \beta " \beta & - 00 x & . \textcircled{R} " ! \\ - x \beta \beta " & - 0! 0 & . 0\textcircled{R} x & ! ! \\ ! \textcircled{R} & - 0 \textcircled{R} " & - \beta ! \textcircled{R} & ! ! \\ ! & \beta & ! ! ! & ! ! \\ ! & ! & \beta ! ! 0 0 & ! ! \end{bmatrix}$$

$$B_0 = \begin{bmatrix} - \beta 0! & . \beta 0 \\ - \beta . & x \beta \textcircled{R} \beta \\ - x ! x & - 0! \beta \textcircled{R} \\ ! & ! \\ ! & ! \end{bmatrix}$$

ææ7E 0 W2(4 +±2(4 - Kb¹ Ô c- Kb¹ 0v9 »
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 'ã . >ï"x • ' Ë(Ý "E Fù& »>ï"x- KbC¹ Ô c-
 KbD *^ »0ôr 6K): ° B.E %
 #ž† , . / Ç Ô c • @@Î

' » gK!2(4)3@ç± ç g , . / Ç Ô c • ±±
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 2(4 Qÿ Ô c)3@ç Ä] - 8 Ç)3^{B "ß Ô}ã

Ç)3æS'ã . ú NµÔ c • ±±2(4 < %o\ / Ç
 ±±"8 ...U • Ç- KbX¹ Ë e • ε > ! \$ Bà 8
 • ËÜU#æ/8 á

$$XA_1 + A_1 X + X B_0 E + E_B E_B - B_1 B_0 F_B \sigma^{-1} B_1 \alpha X + \alpha \epsilon F + \epsilon I = ! \quad \% \times 0 < Z$$

$$A_1 = \frac{P + Q}{0} \quad B_1 = \frac{S + T}{0}$$

$$G = \frac{T - S}{0} \quad H = \frac{Q - P}{0}$$

$$E = \sqrt{h_{\beta} e_{\beta}} - \sqrt{h_{\beta} e_{\beta}} - \sqrt{h_n e_n} - \sqrt{h_{nn} e_n} \hat{O}$$

$$F = \sqrt{h_{\beta} e_{\beta}} - \sqrt{h_{\beta} e_{\beta}} - \sqrt{h_n e_n} - \sqrt{h_{nn} e_n} \hat{O}$$

$$E_B = \sqrt{g_{\beta} e_{\beta}} - \sqrt{g_{\beta} e_{\beta}} - \sqrt{g_n e_n} - \sqrt{g_{np} e_n} \hat{O}$$

$$F_B = \sqrt{g_{\beta} f_{\beta}} - \sqrt{g_{\beta} f_{\beta}} - \sqrt{g_n f_{\beta}} - \sqrt{g_{np} f_{\beta}} \hat{O}$$

< Z " E " E_B " F " F_B ±±Ç v i > î ' ([β Ô%8 7E
 • ËÜU#æ/8 < %o ...U =y? X " F Ô c • g u %o

$$= - \% B_B F_B \sigma^{-1} B_1 X \%$$

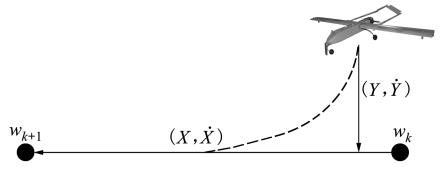
& »=ÖÖ2(4 < %o" g @iæ/8 < %xo±!o
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$$K = \begin{bmatrix} ! ! 00 \textcircled{R} ! \beta \textcircled{R} - ! ! 0 0 - ! 0\textcircled{R} \\ ! ! ! \textcircled{R} ! ! ! - ! \beta - ! \beta \textcircled{R} \end{bmatrix}$$

ú† WÔ > 7W> 7VÆ& CWÔ c

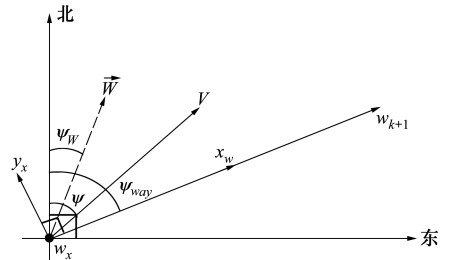
úž† 7VÆ& CWÿÖ " N ,

!>*U ç g ËKrN =yDð8 Z "U 7E² (Ü/ Ç
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 C CW* È "? à ML • ...UD^aTA ò â 8±C CW
 u É ÷ c ^ ELÓ • *G7 p • 0vK MÅ%t @ë -
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$$+ 0æ7VÆ& CWÿ < +$$

lµ & ç g C(Ü7VÆ&Ô c K MÅ" f) + 07VÆ&
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 8N =y • BU%æ L• 7VÆ&ÿÖ æ/8 %oã



$$+ æ ç g L• BU%æÿÖ.g < +$$

$$\dot{x}_w = V \dot{\psi} \%_0 - \psi_{way} \circ + W \dot{\psi} \%_W - \psi_{way} \circ$$

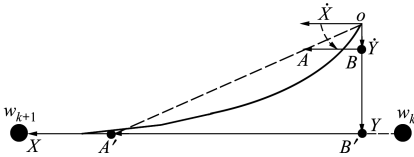
$$\dot{y}_w = -V \dot{\psi} \%_0 - \psi_{way} \circ - W \dot{\psi} \%_W - \psi_{way} \circ \%_0$$

$$u_c = \dot{\psi}$$

< Z " V g/§ EL- FÜ"W g CF MÆL | 7Vÿψ g EL
 Ó- FÜV¹])3 D >±f >ÿ"59Mû> >ÿψ_w g MÆLW

1] 3 D > +±f >ÿ "7VC | >ÿ ψ_{way} \ M±Ç7VC 7W>
 1] 3 D > +±f >ÿ "u_c g L H+±7VE&C CWÔ c %
 úž± 7VE&C CWÔ c æ"

*^ + 0 m.g "7VE&C CWÔ c L->@ @ @ ÎC (Ü Ô c
 (' " k ÉDTM > %&Lj' w wüç oæ< Ô c N g C
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 xy D; Q > z / (æ > - ! " - + x m.g +±ELÓ- FÜ V_{OB}
 1 V_{OA} " z 4 - FÜ S_{OB'} 1 S_{OA'} %



+ xœWÔ > 7VE&Ô c æ"

f > + x m.g " Ä] - FÜ = • Dëå

$$\frac{V_{OB}}{S_{OB'}} = \frac{V_{OA}}{S_{OA'}} \frac{\dot{X}}{kX} = \frac{\dot{Y}}{Y} \quad \%oO$$

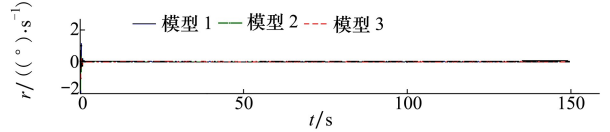
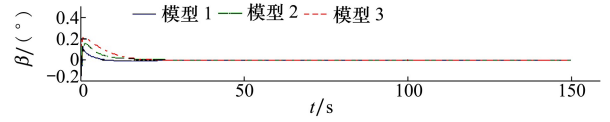
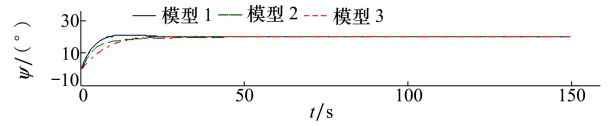
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 g kX ¼ÿ - Y ¼ÿ "59 L H+±7VE&C CWÔ c L->@ »
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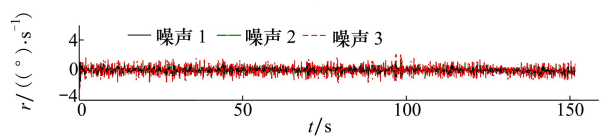
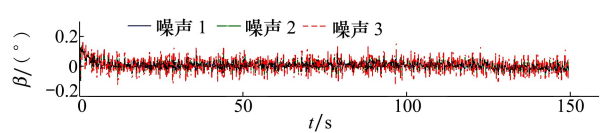
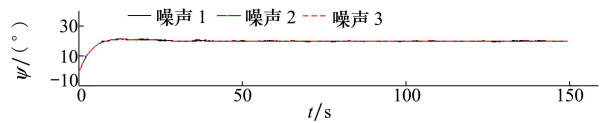
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+ "œD³α C ò â 82(4 , , L 3i



+ œC*y ÿ • ò â 82(4 , , L 3i

¼ž± C(Ü7VE&C CWÔ c , , L

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