

$$x_2 = +ve$$

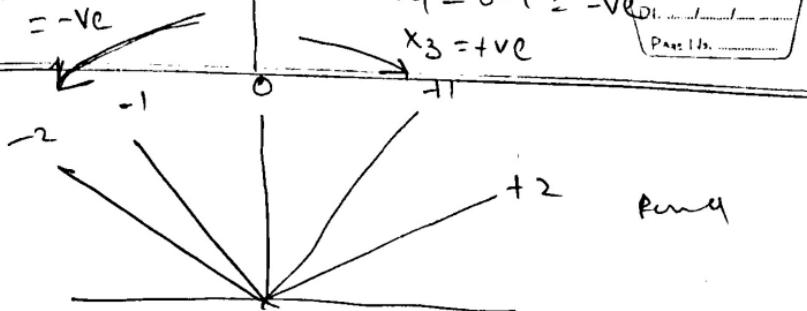
$$x_3 = -ve$$

Task-2B

$$x_2 = 0-1 = -ve$$

$$x_3 = +ve$$

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$$x_2 = -ve$$

$$x_1 = +ve$$

+15

$$x_2 = +ve$$

$$x_1 = -ve$$

-15°

Arm

+90

-90

wheel



+ve - ve

- ve

26.2  
✓

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- ve + ve

$$-(+ve + -ve) = \frac{\text{Pos}}{(+ve)} / \frac{\text{Bal}}{(-ve)}$$

$$-(-ve + -ve) = +ve (\text{Pos & Bal})$$

- ve ↑

Talk-2B

S.28:00

-0.41

D. ....  
Page No. ....

$$\text{New } 1 \quad 100x_4 - 0.008x_2 + 0.5x_6$$

sim-time roll\_val yaw\_err

$$1:37, b = 0, -0.38$$

$$1:58, b = -0.01, -0.33 \downarrow$$

$$2:20, b = -0.0100, -0.30 \downarrow$$

$$3:08, b = 0.0100, -0.29 \downarrow$$

$$4:18, b = 0, 0.30 \uparrow$$

$$100x_4 - 0.01x_2 + 0.5x_6$$

$$1:37, b = 0.01, -0.37 \downarrow$$

$$1:58, b = \sim, 0.33 \downarrow$$

$$3:08, b = \sim, 0.30$$

$$3:49, b = \sim, 0.31 \uparrow$$

$$105x_4 - 0.01x_2 + 0.6x_6$$

$$1.34, b = \underline{0}, -0.10$$

$$105x_4 - 0.01x_2 + 0.4x_6$$

$$2.34 - b = \underline{0}, -0.13$$

$$3.35 - b = \underline{0.0}, -0.09$$

$$-0.029$$

$$5.08 b = \sim, 0.18$$

$$105x_4 - 0.01x_2 + 0.42x_6$$

$$2.34, b = +0.001, -0.23$$

$$100x_4 - 0.01x_2 + 0.38x_6$$

$$2.12, b = -0.01, -0.11$$

$$2.58, b = \cancel{0.00} / -0.03$$

$$100x_4 - 0.02x_2 + 0.36x_6 - 0.00008x_5$$

$$7.31, b = +0.021, -0.509$$

$$42.68, b = +0.04, 0.509$$

~~$$100x_4 - 0.02x_2 + 0.38x_6 - 0.00008x_5$$~~

$$7.78, b = +0.02, b = -0.508$$

$$21.17, b = +0.029, b = -0.34$$

$$34.35, b = +0.018, b = 0.29$$

$$100x_4 - 0.02x_2 + 0.4x_6 - 0.00008x_5$$

T b X

$$7.84, +0.018, -0.508$$

$$21.52, +0.024, -0.35$$

$$30.96, +0.018, -0.137$$

~~$$35.08, +0.009, -0.0008$$~~

$$101x_4 - 0.02x_2 + 0.4x_6 - 0.00008x_5$$

~~$$8.30, +0.019,$$~~

$$7.59, +0.018, -0.509$$

$$21.57, +0.023, -0.35$$

$$31.02, +0.018, -0.137$$

$$35.49, +0.012, -0.0006$$

$$39.97, +0.006, +0.137$$

$$44.84, 0.00, 0.302$$

$$103x_4 - 0.02x_2 + 0.4x_6 - 0.00008x_5$$

$$7:23 \quad +0.018, \quad -0.509$$

$$21:61 \quad +0.021, \quad -0.358$$

$$31:78 \quad +0.017, \quad -0.121$$

$$36:08 \quad +0.012, \quad 0.007$$

$$48:48 \quad 0.00, \quad +0.3$$

~~$$105x_4 - 0.02x_2 + 0.4x_6 - 0.00008x_5$$~~

$$7:85, \quad +0.018, \quad -0.509$$

$$21:64 \quad +0.024, \quad -0.35$$

$$32:29 \quad +0.017, \quad -0.109$$

$$37:33, \quad +0.011, \quad 0.042$$

$$104x_4 - 0.02x_2 + 0.4x_6 - 0.0008x_5$$

$$7:65, +0.018, -0.509$$

$$21:40, +0.024, -0.36$$

$$31:78, +0.016, -0.122$$

$$36:87, +0.012, +0.004$$

$$39:43, +0.08, +0.11$$

$$43:97, 0.00, 0.31$$

$$104x_4 - 0.02x_2 + 0.34x_6 - 0.0008x_5$$

$$7:30 +0.019, -0.510$$

$$7:63 +0.019, -0.509$$

$$21:77 +0.038, -0.34$$

$$32:12 +0.011, +0.11$$

$$39:72 +0.09, 0.217$$

$$44:00 0.00, 0.45$$

$$107x_4 - 0.02x_2 + 0.36x_6 - 0.00008x_5$$

$$7:81 , \cancel{-0.02} + 0.02 , -0.508$$

$$21:74 , + 0.035 , - 0.32$$

$$31:58 , + 0.029 , , + 0.025$$

$$40:48 , + 0.01 , + 0.364$$

$$07x_4 - 0.022x_2 + 0.36x_6 - 0.00009x_5$$

$$7:69 , + 0.023 , - 0.587$$

$$21:63 , , + 0.038 , - 0.306$$

$$31:69 , + 0.029 , + 0.030$$

$$41:00 , + 0.066 , 0.47$$

$$107x_4 - 0.02x_2 + 0.34x_6 - 0.0068x_5 \\ - 0.005x_3$$

$$7: 66, +0.022, -0.508$$

$$12: 69, +0.032, -0.47$$

$$107x_4 - 0.02x_2 + 0.36x_6 - 0.0008x_5 - 0.5x_3$$

$$7: 57, 0.014, -0.513$$

$$12: 44, 0.02, -0.49$$

$$33: 10, +0.027, -0.106$$

$$43: 72, +0.013, +0.29$$

$$107x_4 - 0.025x_2 + 0.36x_6 - 0.00008x_5 - 0.5x_3$$

$$7: 72, +0.015, -0.512$$

$$12: 70, +0.021, -0.48$$

$$22: 13, +0.028, -0.36$$

$$31: 65, +0.027, -0.137$$

$$35: 13, +0.024, -0.024$$

$$49: 22, +0.03, 0.56$$

$$107x_4 - 0.025x_2 + 0.36x_6 - \cancel{0.00002x_5}$$

$$- 0.00002x_5$$

$$- 0.5x_3$$

$$+ 0.001x_1$$

$$107x_4 - 0.025x_2 + 0.31x_6 - 0.00002x_5 - 0.5x_3$$

$$+ 0.0045x_1$$

$$0.34 \quad - 0.37$$

$$0.28 \quad - 0.32$$

$$0.24 \quad - 0.28$$

$$- 0.21$$

$$107x_4 - 0.022x_2 + 0.35x_6 - 0.00002x_5 - 0.5x_3$$

$$+ 0.0055x_1$$

$$0.47$$

$$- 0.43$$

$$0.40$$

$$0.37$$

$$0.33$$

$$x$$

$$0.28$$

$$0.25$$

$$0.0784 - 0.022x_2 + 0.38x_6 - Q^{10} x_5 \rightarrow 0.0056x_1$$

0.35

-0.22

0.15

-0.1

0.06

-0.035



+ 0.39x\_6

0.31

$\downarrow$   
+ 0.4x\_6

0.28

-0.12

0.07

DL 1  
Pig 1b

+ 0.42 X<sub>6</sub>

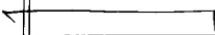
0.22



~~+ 0.50 X<sub>6</sub>~~

+ 0.5 X<sub>6</sub>

0.12



0.5 X<sub>6</sub>

0.08

Setting up

$$0.000043x_5 - 18.01, -0.18$$

SUM

square

$$0.03^2$$

SSE



$$0.0082x_1 -$$

$$10.7x_4 - 0.022x_2 + 0.53x_6 - 0.000043x_5$$

$$-0.58 \text{gt} 0.0052x_1$$

$$0.0052x_1 -$$

$$\underline{-0.15}$$

$$\downarrow 18.52$$

$$0.09 - \text{Max}$$

$$0.034 - \text{SSR}$$

$$0.0054x_1 - 18.86, -0.15$$

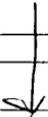
$$21.50, -0.09$$

$$0.0036x_1 - 18.73, -0.14$$

$$21.67, -0.8$$

$$0.066x_1 - 20.70 \leftarrow (-0.08)$$

$$0.0663x_1 - 19.87 \leftarrow (-0.08)$$



$$0.55x_5 \rightarrow 19.40 - (-0.1)$$

$$107x_4 - 0.027x_2 + 0.55x_6$$

$$- 0.000043x_5 - 0.5x_3 + 0.0063x_7$$

~~constant~~

0.07 ~~offset~~

19.47 = -0.11 - settling time -

$$0.03x_2$$

# Tank - 2B

Date / ..  
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$$50x_4 - 0.045x_2 + 1.82x_6 - 0.0000998x_5 \\ - 0.59x_3 + 0.3098x_1$$

- NO - overshoot
- Steady state error - (-0.0003)
- Rise time - (4.90)

$$50x_1 - 0.048x_2 + 1.92x_6 - 0.0000998x_7 \\ - 0.59x_3 + 0.025x_4$$

4:20

0.024

5:35

0.002

5:23 = 0.012

(2)

6:02

0.0028+

7:04

-0.001

15-L

(2)

+ 0.38x\_4

4:60

- 0.013 ✓

5:26

- 0.009

5:39

- 0.007

6:47

- 0.0039

8:23

- 0.0002

0.3098x\_1

4:90 = -0.003

NO overshoot

$$0.03x_1 - (-0.0309) \downarrow - 14:86$$

Dt. .... / ... / ...  
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(OS)

$$0.032x_1 - (-0.0009) \downarrow - 14:84 = (0.32)$$

$$0.034x_1 - (-0.00083) \downarrow - 14:85 - 0.37  
(OS)$$

$$0.36x_1 - (-0.00033) \downarrow - 14:77 - 0.42  
(OS)$$

$$0.34x_1 - (-0.0008) \uparrow - 14:85 - 0.44  
(OS)$$

$$0.35x_1 - (-0.0008) \downarrow 14:57 - 0.39  
(-0.0006) \downarrow 15:27  
(OS)$$

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$$0.0000996x_5 - (0.004) 14:91 - 0.42  
(OS)$$