

2 Mousmot

Problem # 1 b) Pa = [0,1,2] T, Pb = [-1,1,1] T Rx = 30°, Find Pa and Pb

 $R_{x}(30^{\circ}) = 1$ 0 0 $P_{New} = TP_{01d}$ 0 Cos30' - Sin300 Sin30 Cos30

 $P_{0}' = R_{x}(30^{\circ})P_{0} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \cos 30 & -\sin 30 & 1 \end{bmatrix} = \begin{bmatrix} \cos 30 - 2\sin 30 \\ \sin 30 & \cos 30 \end{bmatrix} Z = \begin{bmatrix} \sin 30 + 2\sin 30 \\ \sin 30 + 2\sin 30 \end{bmatrix}$

 $P_a' = 0$ -0.1340 2.2321

 $P_b' = R_x(30^\circ) P_b = 1$ 1.6 0 e1 = -1.600 0 $\cos 30$ - $\sin 30$ $\cos 30$ - $\sin 30$ $\cos 30$ + $\cos 30$ + $\cos 30$ $\cos 30$ + $\cos 30$

 $P_{b}^{1} = \begin{bmatrix} -1 \\ 0.3660 \\ 1.3660 \end{bmatrix}$

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	Dc(0,+02+03+04)						
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	TE 1001+10						
	OT = OT 1 T 2 T 3 T 4 T 5	TST =	0 1	g t.	(0)		
	C(0,+0,+0,+0,+0,+0,5+						
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	-S(B ₁ +B ₁ O _{B-1})3B ₁₁						
	-5(B ₁ , B ₂) 5B ₁	μθ) (μθ+,θ+ 0	,00	+ C(&, † 0= +0 0	(,0)	0+,6),0	7
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	-5(B ₁ , B ₂) 5B ₁	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	$(\theta_1 + \theta_2 + \theta_3)$ $(\theta_1 + \theta_2 + \theta_3)$	+ C(0,+0 + S(0,+0	z) + CO, 1 z) + SO,))]
	$D(c(\theta_1+\theta_2+\theta_3+\theta_4+6))$ $D(s(\theta_1+\theta_2+\theta_3+\theta_4+6))$	$\frac{\partial}{\partial s} + C(\theta_1 + \theta_2) + S(\theta_1 + \theta_2)$	0 0 0 0 0 0 0 0	(0,+0z+0z)	+ C(0,+0 + S(0,+0	z) + CO, 1 z) + SO,))]
	D(C(0,+02+03+04+6	$\frac{\partial}{\partial s} + C(\theta_1 + \theta_2) + S(\theta_1 + \theta_2)$	0 0 0 0 0 0 0 0	$(\theta_1 + \theta_2 + \theta_3)$ $(\theta_1 + \theta_2 + \theta_3)$	+ C(0,+0 + S(0,+0	z) + CO, 1 z) + SO,)	
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	$D(c(\theta_1+\theta_2+\theta_3+\theta_4+6))$ $D(s(\theta_1+\theta_2+\theta_3+\theta_4+6))$	$\frac{1}{9} \left(\frac{1}{10} + \frac{1}{10} + \frac{1}{10} \right)$ $\frac{1}{10} \left(\frac{1}{10} + \frac{1}{10} + \frac{1}{10} \right)$ $\frac{1}{10} \left(\frac{1}{10} + \frac$	0 0 0 0 0 0 0 0	$(\theta_1 + \theta_2 + \theta_3)$ $(\theta_1 + \theta_2 + \theta_3)$	+ C(0,+0 + S(0,+6	z) + CO, 1 z) + SO,)	
sü : (, 6 r,	$D(c(\theta_1+\theta_2+\theta_3+\theta_4+6))$ $D(s(\theta_1+\theta_2+\theta_3+\theta_4+6))$	$\frac{\partial}{\partial s} + C(\theta_1 + \theta_2)$ $\frac{\partial}{\partial s} + S(\theta_1 + \theta_2)$	+0 ₃ +0 ₄) + C	$(\theta_1 + \theta_2 + \theta_3)$ $(\theta_1 + \theta_2 + \theta_3)$	+ C(0,+0 + S(0,+6	2) + CO,)	
	$D(c(\theta_1+\theta_2+\theta_3+\theta_4+6))$ $D(s(\theta_1+\theta_2+\theta_3+\theta_4+6))$	0 0 0s) + C(0, + 0z 0s) + S(0, + 0z	+03+04) + C +03+04) + S	$(\theta_1 + \theta_2 + \theta_3)$ $(\theta_1 + \theta_2 + \theta_3)$	+ C(0,+0 + S(0,+6	2) + CO,)	
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	$(C\theta_1C\theta_2 - S\theta_1S\theta_2)$ -	15/13		*	
	$(\delta\theta, C\theta_2 + C\theta, S\theta_2)$	$(C\Theta_1C\Theta_2 - S\Theta_1S\Theta_2)$	P Selv		
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	LS(0,+02) + LSO,				
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	* Transform from the	base to the li	ast frame: 0	0	
1	3T = C(0,+02+ D23)	-S(0,+02+1)	-3) 00 L(C)	$(\theta_1 + \theta_2) + C\theta_1$	
		C (0,+02+0			
	0	0	l	L3	
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	$X = L \left[c(\theta_1 + \theta_2) + C(\theta_1 + \theta_2) \right]$		g2+ Ω3)		
	Y= [[S(0,+02) +SE				

Problem #4 $R_{x}(\alpha) =$ $R'_{y}(\phi) = \cos \phi$ 0 0 Sin o Cos & - Sin & 0 0 0 -Sin b Sind Cosk Cos ф 0 Rx(&)= Ry(\$) = Cos\$ 0 0 0 Sin \$ 0 Coso - Sink b 0 -Sin & 0 Sind Cos o CosX 0

0

0

 $T = R_x(\alpha)R_y(\phi) =$

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	SindSind	Cosk	-Cosksino	b		
	-Cost Sin +	Sink	Cosd Cost	0		
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