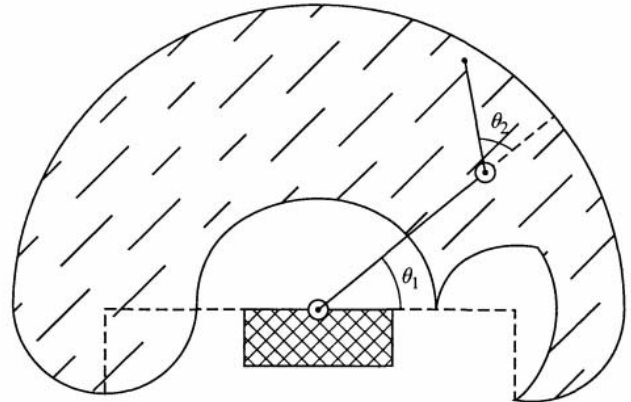


HW Assignment Solution for EML 4806 CH 2

Problem 4.9:

This is slightly trickier than it looks at first.
Approximately:



Problem 4.24:

<i>Revolute</i>	<i>Linear</i>
$\alpha_{i-1} = \text{atan2}(-T_{23}, T_{33})$	$\alpha_{i-1} = \text{atan2}(-T_{23}, T_{33})$
$\theta_{i-1} = T_{14}$	$a_{i-1} = T_{14}$
$d_i = \sqrt{T_{24}^2 + T_{34}^2}$	$\theta_i = \text{atan2}(-T_{12}, T_{11})$

Problem 4.26:

Use ${}^3P = {}^3P_{\text{heel}} = [0 \quad -50 \quad 0]^T$. Since

$${}^0_3R = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

we have

$${}^0P_{3ORG} = \begin{bmatrix} 900 - 200 \\ 0 + 400 + 50 \\ 0 \end{bmatrix} = \begin{bmatrix} 700 \\ 450 \\ 0 \end{bmatrix}$$

Now, starting with (4.6), one follows a method of §4.4 to get $\Theta = [52.6^\circ \quad -45.1^\circ \quad -7.56^\circ]^T$.
(The other solution would not be feasible for the human knee joint.)