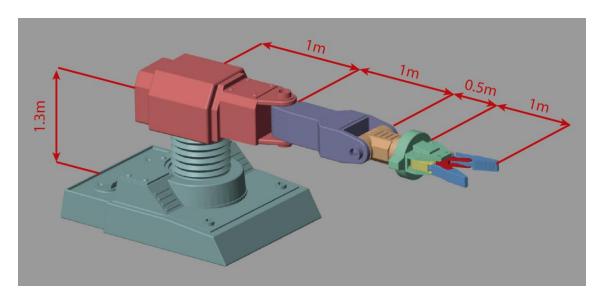


Modelo cinemático del manipulador industrial



Cinemática Directa:

- Px = 12*cos(q1)*cos(q2) (14 + 15)*(cos(q4)*(sin(q1)*sin(q3) cos(q1)*cos(q2)*cos(q3)) + cos(q1)*sin(q2)*sin(q4)) 13*sin(q1)*sin(q3) + 13*cos(q1)*cos(q2)*cos(q3)
- Py = $(\cos(q4)*(\cos(q1)*\sin(q3) + \cos(q2)*\cos(q3)*\sin(q1)) \sin(q1)*\sin(q2)*\sin(q4))*(14 + 15) + 12*\cos(q2)*\sin(q1) + 13*\cos(q1)*\sin(q3) + 13*\cos(q2)*\cos(q3)*\sin(q1)$
- Pz = 11 + 12*sin(q2) + (14 + 15)*(cos(q2)*sin(q4) + cos(q3)*cos(q4)*sin(q2)) + 13*cos(q3)*sin(q2)

Cinemática Inversa

Suponiendo q2=0 y q4=0

- q4=asin((Pz-l1)/(l4+l5)) %Dos soluciones
- q3=[acos((Px^2+Py^2-12^2-K^2)/(2*12*K)), -acos((Px^2+Py^2-12^2-K^2)/(2*12*K))]
 - o K=13+(14+15)*cos(q4);
- q1=atan2(B,A)+atan2(sqrt(A.^2+B.^2-C.^2), C)
 - A=Py;
 - o B=-Px;
 - o C=K*sin(q3);