Denavit-Hartenberg parameters

1. Summary of the link parameters in terms of the link frames [1]

a_i = the distance from $\hat{Z}_i$ to $\hat{Z}_{i+1}$ measured along $\hat{X}_i$. (1)

α_i = the angle between $\hat{Z}_i$ and $\hat{Z}_{i+1}$ measured about $\hat{X}_i$. (2)

d_i = the distance from $\hat{X}_{i-1}$ to $\hat{X}_i$ measured along $\hat{Z}_i$. (3)

θ_i = the angle between $\hat{X}_{i-1}$ and $\hat{X}_i$ measured about $\hat{Z}_i$. (4)

2. Summary of link frame attachment procedure [1]

1. Identify the joint axes and imagine (or draw) infinite lines along them. For steps 2 through 5 below, consider two of these neighboring lines (at axes i and $i+1$).
2. Identify the common perpendicular between them, or point of intersection. At the point of intersection, or at the point where the common perpendicular meets the i th axis, assign the link frame origin.
3. Assign the $\hat{Z}_i$ axis pointing along the i th joint axis.
4. Assign the $\hat{X}_i$ axis pointing along the common perpendicular, or if the axes intersect, assign $\hat{X}_i$ to be normal to the plane containing the two axes.
5. Assign the $\hat{Y}_i$ axis to complete a right-hand coordinate system.
6. Assign $\{0\}$ to match $\{1\}$ when the first joint variable is zero. For $\{N\}$, choose an origin location and $\hat{X}_N$ direction freely, but generally so as to cause as many linkage parameters as possible to become zero.

References

[1] J. J. Craig, *Introduction to Robotics: Mechanics and Control*, *2nd ed.*, Addison-Wesley, Reading, MA, 1989.