The four Ws'

Please make a new document for each topic, so it will be easy to edit if there is a mistake.

- Who are you addressing:

  scientists who are specialists in your field of research, a wider group of scientists, fellow students, or public audiences?
- Why is your message important?

  Why are your communicating it? Presumably you are not doing it just for credits, but to add to the pool of knowledge
- What are your main findings or "take-home" messages? '

  What are you going to present - new research results or a review of a topic? What prior knowledge, expectations and questions might your audience have? What technical language do they understand?
- How can you best deliver your message and satisfy the audience's need?

  How will the audience use its new knowledge?

Test template

Use this template when you need to make a test of somthing

Purpose:

Test equipment:

Procedure:

Measuring data:

Results:

Uncertainties of measurement:

Conclusion:

Contents

All surgical interventions with the Da Vinci robot require some sort of feedback for the user, in our work we are covering force/haptic feedback. This type of feedback translates the forces acting on the surgical instrument to the haptic controller in some manner. The haptic controller used in this work is the Phatnom Omni (aka Geomagic Touch) developed by Sensable Technologies. It is one of the most cost effective haptic controllers currently on the market.

In order for useful feedback to be created, we need to be able to control the direction of the force created by the Phantom Omni. A logical first step would be to derive the relationship between joint coordinates and end-effector position (the end-effector in this case being the point of contact between the user and device). Once we have this, it is possible to develop other constructs such as Jacobian and dynamic equations.

We derive the forward kinematics of the Phantom omni using the DH-algorithm for simplicity. Also, since the actuated joints only control the position, and the orientation joints are concentrated in a small space, we can separate the FK matrices into translational and rotational parts.

Phantom Omni DH parameters			
a	d	θ	α
0	0	q_1	0
0	0	q_2	$\frac{\pi}{2}$
A	0	q_3	0
0	D	q_4	$\frac{\pi}{2}$
0	0	q_5	$-\frac{\pi}{2}$
0	0	q_6	$\frac{\pi}{2}$

(1)

$$\mathbf{T_0^1} = \begin{bmatrix} \cos\theta_1 & 0 & \sin\theta_1 & 0 \\ \sin\theta_1 & 0 & -\cos\theta_1 & 0 \\ 0 & 1 & 0 & d_1 \\ 0 & 0 & 0 & 1 \end{bmatrix} \tag{2}$$