Defining Rotations Limits using Quaternions In 3d Space

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Hi,

This may be a stupid question, but I have recently discovered quaternions as a method of defining rotations in 3d space. As an aside I am from computer science background rather than a pure maths one.

What I am trying to achieve is the following. Imagine I am defining the rotation that occurs between ones upper and lower arm at the elbow joint. This has 3 (DOF) degrees of freedom and if it was to be defined using euler angles it may be achieved using 3 such angles. The limits of the overall motion allowed by the elbow joint would be achieved by putting limits of each euler angle. However as I am sure you are aware if you describe a series of euler angles, the problem of Gimbal lock can occur.

Ok so rather than describing the possible rotations using euler angles, I am looking to achieve this using one or more quaternions. Any suggestions about how I could achieve this would be much appreciated, with the main problem that I am grappling with is how I can define limits of this quaternion based rotation in order to enforce restrictions on the freedom of rotation(s) that mimic a real joint.

Any help much appreciated,

Adam

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