Subject: Re: Averaging quaternions Posted by John Lansberry on Fri, 19 Mar 2004 15:22:31 GMT View Forum Message <> Reply to Message

Sorry, I didn't finish before sending. I should have mentioned, however, that Craig's suggestion to just "average the components and normalize" is, in fact, a common approach (see, for example, CLAUS GRAMKOW, "On Averaging Rotations", International Journal of Computer Vision 42(1/2), 7-16, 2001).

So Craig's suggestion is certainly one method (just not one I happen to like very much).

No scolding intended.

John

"John Lansberry" < john.lansberry@jhuapl.edu> wrote in message news:c3f1hp\$fto\$1@aplcore.jhuapl.edu...

"Craig Markwardt" <craigmnet@REMOVEcow.physics.wisc.edu> wrote in message

> news:on65d167y8.fsf@cow.physics.wisc.edu...

>> GrahamWilsonCA@yahoo.ca (Graham) writes:

>>

- >>> Does anyone know if it is possible to take an average of regularly
- >>> sampled quaternions to get a mean orientation (i.e. a mean rotation
- >>> matrix)? I seem to recall there being a trick involved but beyond
- >>> re-normalizing the resuling (averaged) guaternion, I cannot remember
- >>> what it is.

>>

- >> I am sure I will be scolded by somebody, but I believe that you can
- >> average the quaternion components, and then normalize as you say.
- This is assumes that you are noise dominated.

- > Averaging components is a bad idea no matter what, since the result is never
- > a "quaternion." The OP doesn't imply anything about "noise."

>

- >> Also, there is one trick that I can think of, which is that
- >> guaternions are degenerate. For each unique rotation, there are two
- >> possible quaternions whose components have opposite signs. This is
- >> because a positive rotation about axis V is identical to a negative
- >> rotation about axis -V.

>>

- >> If your system is capable of both signs indiscriminately, then you
- >> must make the sign conventions uniform. For example, by always making
- >> one component positive.

>

- > You are correct that q and -q represent the same rotation that's not
- > "degenerate", it's just not "unique." Typically, the "scalar" part of the
- > quaternion, cos(theta/2), is chosen to be the component that's always
- > positive.

>

> John

>

>