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:c3f1hpfto1@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) quaternion, 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
>> quaternions 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
>
>