Subject: Re: Averaging quaternions
Posted by Arnold Neumaier on Mon, 22 Mar 2004 08:54:59 GMT
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jelansberry wrote:

> I'm not following what you mean by a "normalization" interval (or
> "normalization bounds" below). Euler angles do not require "normalization."
> I still maintain that any "discontinuity" in the Euler angles usually is the
> result of passing through the singularity that exists in any three-parameter
> representation of the direction cosine matrix, and it is generally easy to
> avoid this situation.

No. One has this phenomenon alreasy in 2D rotations. The rotation angle is determined
only up to a multiple of 2 pi, and one has to normalize the angle by, say,
forcing it into the interval ]-pi,pi]. Then you get problems in averaging
two very close rotation angles, one just below pi, one just abouve -pi.
The result will be close to zero instead of close to +-pi.

If you choose as normalization interval [0,2 pi[, the same problem happens
when averaging a tiny rotation to the right (angle=eps) and to the left
(angle=2 pi-eps).

There is no way to avoid such discontinuities, and one has the same
problems in 3 dimensions, and with quaternions.

But the quaternion recipe I gave a few days ago works perfectly
if the rotations to be averaged are not too much scattered.

Arnold Neumaier