GEORDIE'S QUATERNION DECISION

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During a recent presentation on strapdown inertial navigation computation routines, I made the point that selection of a direction cosine matrix or quaternion for attitude referencing is arbitrary for today's algorithms and computer capabilities; either provides the same attitude accuracy with equivalent computer implementation requirements. The question was then raised of what criterion should then be used for selecting the attitude algorithm. Since engineering tradeoffs do not favor either direction cosines or a quaternion, I decided to explore the question further at my home office from a non-engineering standpoint.

I asked my grandson Geordie who is very wise (for his age - but he is only 6 years old):

"Geordie, which would you use, a direction cosine matrix or quaternion for strapdown inertial attitude referencing?"

Geordie said to me (with much hand motion – he is very expressive that way):

"Grandpa, I think I would use a quaternion because then when I tell my friends at school, they will think I understand strapdown inertial navigation."

But then he also said (whispering so that only I could hear):

"Actually Grandpa, I think I would really use direction cosines because they are easier to understand."

I agree with Geordie. Of course, the above story is somewhat exaggerated. Geordie actually does not understand direction cosines or quaternions, yet.