1125-15-49   **Paul R. Bouthellier*** (`pbouthe@pitt.edu`), 504 East Main Street, Titusville, PA 16354.
Visualizing Gimbal Lock and Quaternions with the HTML5 Canvas.

Quaternions are always discussed in the context of gimbal lock. However, as there exist a number of different definitions of gimbal lock, there is often a great deal of confusion in discussions of the topic. In this talk we shall look at several different definitions of gimbal lock, including the general aerospace and computer graphics versions. We shall look at the mathematics behind the concepts, what gimbal lock means in each field, and illustrate these definitions with interactive web pages using the HTML5 canvas. We then shall examine why quaternions avoid gimbal lock when used properly, and can still result in gimbal lock when used improperly. The concepts will again be illustrated with interactive web pages using the HTML5 canvas. (Received June 22, 2016)